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Radio Relay, the War's Great Development in Signal Communications

MAJOR GENERAL W. S. RUMBOUGH, *Signal Corps*

General Rumbough was Chief Signal Officer of the European Theater of Operations during World War II.—THE EDITOR.

ON the morning of D+2, 8 June 1944, First Army put its radio link station ashore on Omaha Beach and at 1314 it went into operation from the bluff above the Beach. The Headquarters in Normandy was thus in communication with a similar station on St. Catherines Hill, Isle of Wight, and through that station with the IX Tactical Air Force at Middle Wallop or the 21st Army Group, near Portsmouth, and through switchboards at these headquarters with the general wire system of the American and British armies in Southern England. This inaugurated the use of radio relay in United States operations in the European Theater.

Colonel Grant Williams, Signal Officer of the First Army, and Colonel E. Blair Garland, Signal Officer of the IX Tactical Air Force, were responsible for the success of radio relay. This was not ordinary, old familiar radio, with a single channel, an isolated circuit, separate from the general communication system. This new radio relay system was multi-channel; it had several speech circuits and several teletype circuits and it transmitted pictures and sketches. Perhaps the most striking feature was that it connected directly into the telephone and teletype switchboards at either end. These radio circuits thus became much more efficiently usable, being the approximate equivalent of wire circuits. Moreover, the equipment was more stable, more reliable and more easily kept in operation than we in the European Theater of Operations had dared hope. We had feared that operation would be "tricky" and that only long-trained "experts" could handle the equipment. This proved not to be the case.

This was new equipment; development had been rushed through the laboratories; the manufacturers were building the equipment under intense pressure from the Chief Signal Officer. Shipments were being made to us in the ETO as rapidly as the sets could be seized from the production lines. And this intense pressure to manufacture, to ship to the Theater and to issue to the troops continued to saturation. Tables of Allowances had not caught up with this equipment. At Theater Headquarters we kept informed of the relative needs of the several Army Groups, Armies, Air Forces, and forward sections of Communications Zone, and as new shipments were received we issued the equipment immediately in accordance with requirements. On VE-day there were sufficient sets issued in the ETO to provide 296 point-to-point installations or seventy-four 100-mile systems, each of these seventy-four systems comprising two terminal stations with spares. These quantities were actually in the hands of users on VE-day after certain small combat losses had been replaced.

Radio relay equipment is a revolutionary development in communications. Looking to the future of the Army, it seems certain that radio relay will have an important effect on the make-up of new tables of organization of communication units from the division all the way back through the Communications Zone. Its general features will be studied at the service schools because it will be a potent factor in the control of military operations. Every commander and every staff officer who is responsible for operations will want to know what service he may expect from radio relay; he will be interested in its mobility, its transport and its location in his road columns or landing craft and in how to direct its general employment. This brief article will be restricted to general features of the equipment; it will be non-technical.

Radio Relay Competes with Wire

Most of the radio relay equipment in the

European Theater was used forward of Army Group Headquarters. Here it competed with field wire, with spiral-four cable, with rehabilitation of French, Belgian, and German open wire and cable and with Signal Corps construction of open wire and cable. All these types were used and each had special advantages in special situations. For long-term use, newly constructed standard type open wire or cable circuits were best in quality and reliability, but they were most expensive in time, in troops and in transportation. Such construction could not keep up with the rapid sweep across France from Normandy to the Siegfried Line.

Rehabilitation of French open wire and cable was indicated whenever a tactical axis followed an existing circuit route. However, destruction had been severe. Our own air bombing had destroyed enemy air fields, railroad yards, bridges and other military objectives and, with them, all the communication lines in the vicinity. In their retreat, the Germans had effected widespread demolition, including repeater stations and any bridge and bridge-supported cables which had not already been destroyed by our air bombardment. In addition, there was much battle damage to wire lines and cables. As a result, considerable time and effort was required to restore existing lines and cables to operation, and in many cases destruction was so complete that forward units could not rehabilitate lines in time to meet their requirements. It remained for Communication Zone troops and French telephone men to place these lines and cables in service to serve as the backbone of the rear area communication system to control supply, administration, and evacuation.

Field wire could be laid rapidly; it was used in enormous quantities, over 900,000 miles being consumed in the ETO during the eleven months of operations, 105,000 miles of it during the last month prior to VE-day. However, field wire was suitable for distances only up to about twenty miles. Spiral-four cable was the closest competitor of radio relay. It could be laid rapidly in the manner of field wire, placed on the ground, tied to trees, draped on top of hedges. But, even though tough and heavy, it was not proof against black-out traffic, road repair operations, construction projects, tanks moving off the road, and other hazards of congested areas. This field wire type of construction was permissible for short distances when circuits had to be produced quickly, but for longer leads it was subject to too many interruptions and required excessive numbers of maintenance men. For long circuits involving repeater stations, spiral-four was placed overhead and tied up carefully, usually being suspended from messenger wire.

It was the general case, rather than the exception, that long circuits were required or desired faster than any type of wire circuits could possibly be installed. The big advantages of radio were that it could be put into operation quickly and it needed few maintenance men. Radio relay retained these advantages and had the additional ones that a single installation furnished several telephone and several teletype circuits and that each of these circuits became a part of the general communication system and was readily connectible with any telephone or any teletype machine in the system. The virtues of radio relay were striking and of vital importance. The equipment was in tremendous demand by the Signal Officers of all Army Groups, Armies, Air Forces and forward sections of the Communication Zone. Demands were so urgent that the Theater Signal Officer found it desirable personally to receive requests for it and to direct issues of new equipment as it was received.

What the Equipment is Like

Radio relay differs from the usual field radio equipment in several important respects. One is that it remains in operation continuously. Its circuits are out of service for only a few minutes each day while the circuits are being realigned and the equipment maintained. This period is generally designated as a precisely fixed time shortly before dawn or at some other time when the circuits are expected to be in least demand. Care is taken to have spare transmitter, re-

ceiver, gas engine generator, extra tubes and other parts at each station and to have a radio repairman and a power equipment maintenance man on each shift. The sets are used in rotation and as soon as a switch is made, the attendants check the equipment which has been removed from service and prepare it for operation in its next turn or for immediate use if trouble should develop in a component which is currently in service. Anyone who has been responsible for the operation of small stationary gas engine driven power plants would probably guess that this was the most difficult part of the equipment to keep in operation; this guess would be correct. Eternal vigilance was necessary on the part of the gas engine maintenance man and high standards of maintenance and good supervision were required of the officer in charge of the system. When stations were dependent on their own small power plants, as was usually the case with relay stations, since they were generally located on isolated hill or mountain tops, and as was often the case with terminal stations, the officer in charge generally had a specified schedule to shift from one generator to another at each station. A procedure used in the ETO was to make the shift every three hours, changing over instantly and simultaneously on a signal transmitted over circuit number one, the engineering circuit, all stations having been alerted a few minutes before the schedule time and all switching immediately on the signal. At each new location, the station crew explored the possibility of taking the station's power from any nearby Diesel, large gas engine driven generator or other source of electric power in order to save wear on the station's own small, light-weight equipment. No claim is made that radio relay operated perfectly in the ETO. However, by reasonable standard, it was "reliable." Its performance greatly exceeded our expectations.

Another difference from usual field radio equipment is that radio relay is duplex in operation; that is, the transmitting and receiving circuits are both in operation continuously; both are "on" simultaneously. With the usual field radio it is impossible for the listener to break in on the talker because the latter's receiving circuit is "out" while his transmitting circuit is "on" and he could not hear an attempted interruption. Since both the receiving and transmitting circuits of radio relay are in operation continuously, the listener can break in at any time. This makes the conversation natural and more efficient of circuit time; it is like talking over a wire telephone circuit and, in fact, the users would not know whether they are talking by radio or by wire except that the switchboard operator cautions when the connection is made, "You are using a radio circuit; you are cautioned not to divulge secret or confidential information." Some Signal Officers believe such a caution redundant since it is also forbidden to discuss secret or confidential matters in the clear over wire circuits. This duplex operation necessitates the use of two frequencies between each two stations in the chain, one to carry the conversation one way and the other the other way. A hundred-mile set-up using three relay stations and two terminal stations has four station-to-station links, and since the frequencies must not be duplicated within this range, such a chain of stations uses four times two, or eight different frequencies. This is expensive of frequencies, of course, but there are 300 frequency settings available within the thirty million cycle band of the equipment, which covers from 70 to 100 million cycles. The equipment is frequency modulated and thereby is less subject to interference than if amplitude modulated.

Another important difference between radio relay and usual field radio is that the latter is single channel whereas radio relay can be, and almost always is, used in conjunction with telephone and telegraph carrier equipment to produce several channels of each. The field telephone carrier produces four telephone channels and telegraph carrier can be superimposed on one or more of these telephone channels to produce four teletype channels for each telephone channel so used. The possible combinations are: four telephone and no teletype; three telephone

and four teletype; two telephone and eight teletype; one telephone and twelve teletype or no telephone and sixteen teletype. The combination which usually best fits the need is three telephone and four teletype.

A fundamental disadvantage of radio is that it is subject to interception. The radio relay equipment used in the ETO had this disadvantage, but to a less degree than the usual type of radio. Radio relay employs such very high frequencies that reception is restricted almost to line of sight; moreover, its di-pole antenna is beamed on the distant station with which it works and the angle of dispersion is relatively narrow. Hence, in order to listen in on a transmission over one of these circuits, an enemy would have had to be either very near the station or else be almost in line with the two stations and up on an elevation. We monitored various of our radio relay circuits from time to time and found considerable information being transmitted which was dangerous and which would have been more dangerous if our armies had been in static position. It was verified when higher German headquarters and installations were captured and through investigations after VE-day, that the Germans did have the ample and efficient radio and signal intelligence organizations which we had expected them to have. However, these services operated under the serious disadvantage of being forced frequently to withdraw their stations to the rear under the pressure of our advance. This handicap applied particularly to elements which would have had to be located close up to the front in order to intercept our short-range transmissions such as radio relay. It would be impossible to make an authoritative statement that the Germans had never intercepted important radio relay traffic but it is believed that they did not. At any rate, nothing occurred during the operations to indicate that they had made use of any intercepted American radio relay message. It was fortunate for us that radio relay was needed urgently only during rapidly moving phases of operations and that when, from time to time, our advance was temporarily checked, time became available to install spiral-four cable or open wire or to rehabilitate existing wire or cable circuits and thus to be able to relegate radio relay to stand-by or emergency use. However, and in spite of our good fortune in being able to use radio relay rather freely in the European campaigns, it should never be forgotten that speech in the clear is dangerous over any kind of circuit and particularly over radio circuits, and that even though radio relay is less insecure than normal field radio, it must be used with caution. Our written message traffic was well protected by our cryptographic systems but we did not have available voice secrecy equipment for application to radio relay circuits.

Speed and Economy

The characteristics of radio relay which made it outstanding in fast-moving operations were its speed of installation and its economy of personnel and transportation. In World War I the speed of attack was that which infantry could make through organized defenses. Each mile was won at the cost of terrific losses and the attack thus became weaker and weaker until it was halted through sheer exhaustion. Even the most carefully prepared and prodigally supported "drive" with selected units in the assault and backed up by reserves massed in rear, lost its punch within three or four days. Five, six, a dozen miles was termed victory.

But World War II moved swifter and farther. The basic pace was that of mechanical vehicles and the speed with which the armored spearhead could be supported. Immediate support was by infantry in trucks and by air bombing and strafing. This immediate support was followed by infantry on foot, mopping up and cleaning out pockets of resistance but with other elements moving forward in route column. Further support was given by the advance of weapons of all types, by supplies moving up by road and railroad and with more urgent shipments by air. Close air support was essential and this meant that damaged enemy air fields had to be repaired and new ones constructed close

behind the forward elements. Evacuation of wounded had to be taken care of daily, hourly. Once the enemy defensive line had been breached in Normandy, the attack moved so swiftly as to prevent the defeated troops reorganizing a defense in Western France, and for 400 miles the attack pushed with incredible speed against an enemy who was being by-passed, confused, routed in detail and blasted from the sky.

None of these things could have been done without direction and coordination, and when one thinks of direction and coordination he is thinking of signal communications. Effective communication was the key to the success of our operations, and during the vital periods when those operations were moving fast, radio relay was the key to effective communications in the forward areas. Radio relay could be installed quickly, it could be moved swiftly to meet a changing situation, it carried great volumes of traffic and it made minimum demand on road space, on personnel and on our hard-pressed supply system.

The great advantages of radio relay over wire circuits which could carry equivalent traffic is shown best by figures. Material for a 100-mile wire line with four wires weighs ninety-four ship tons, whereas radio relay for that distance weighs only twenty-five ship tons. The construction of such a wire line would take four battalions, or 1,820 men ten days, while forty-four men can install the equivalent radio relay and put it into operation in two days or less. Moreover, after the wire line has been constructed every foot of it is vulnerable to bombing, sabotage, demolition, accidents from vehicles; even buried cables were cut by bulldozers, graders, etc.; whereas a radio relay system is subject to trouble at only the two terminal stations and the two or three relay stations, and there are always alert men at each of these points to prevent or to correct immediately any interruption.

The equipment is adaptable for installation in trucks or trailers or in the Hut HO-17 (modified for increased headroom), this hut being designed to fit in the 2½-ton, 6x6 truck body and to be readily removable (by crane) for placement on the ground at the site selected. At Bristol, England, in April 1944, the First Army installed the pilot model of its radio terminal equipment in a one-ton trailer in less than two working days. Additional installations were made rapidly and were completed in time for the Normandy invasion. The carrier terminal equipment was installed in a 2½-ton, 6x6 cargo truck and this truck towed the radio trailer. Thus the entire equipment for the terminal for three telephone and four teletype circuits and the operating personnel was placed on the road as a single truck and trailer unit. Complete equipment for a relay station was installed in a 1½-ton, 6x6 truck. Many different variations of these installations were made in the ETO, and almost invariably each crew which made an installation felt that it had the perfect solution, that it had the neatest and most efficient setup in the Theater.

When used at and forward of Army Headquarters, stations are apt to move frequently and it is a great advantage to have the equipment installed in a vehicle, but for rear area stations it is generally more convenient and certainly more economical of transportation to set up in a building or tent and thus to release the transporting vehicles for other duty. When this is done, of course, there must be longer notice of an impending move and high priority must be given for the necessary vehicles to carry the equipment and personnel to the new site.

Figure 1 shows a terminal station in a tent. Outside the tent there are two antennas, one for receiving and one for transmitting, and at least two gas engine generators, one in operation and one or more in stand-by position. Figure 2 shows a relay station installed in a half-ton weapons carrier. A generator is shown outside and, beyond it, the mast of one of the four antennas; one of these is for receiving and one for transmitting up the line, and one of each for down the line. Figure 3 is a pictorial view of a system with two terminal and three relay stations.

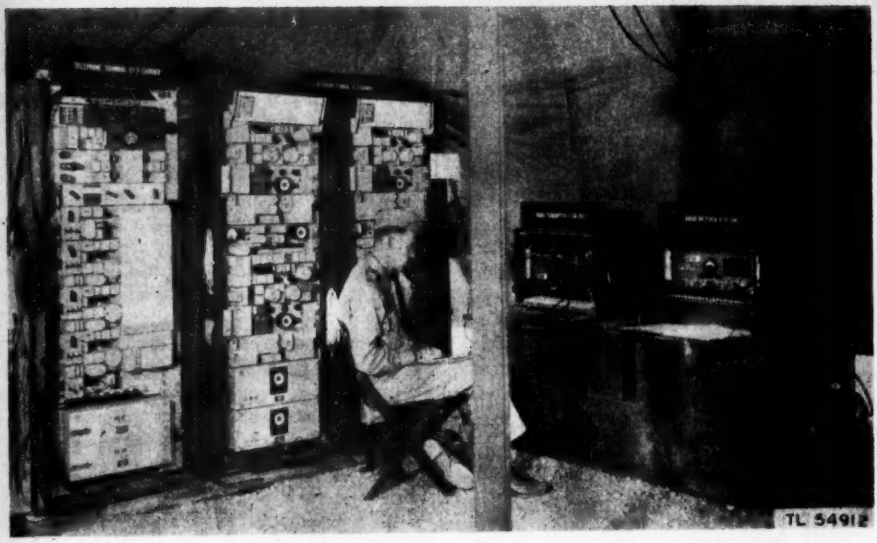

Figure 1.—Radio relay terminal station in tent. Left to right are CF1 telephone terminal carrier, two CF2 teletype carriers, radio transmitter and radio receiver.

Radio Relay in Operations

Specific examples of the use of radio relay show its value. Radio relay made its reputation from the start, in North Africa, in Sicily and in the first campaigns in Italy, even though this early equipment provided only a single duplex channel of teletype. The first long circuit was from Allied Force Headquarters at Algiers to Hill 609 in Tunisia and thence to mobile stations at Bizerta and Sidi-Bou-Said (near Tunis). The total length was 379 miles using four relay stations. The longest span was 120 miles between the relay station on Tourka at 4,900 feet elevation and the relay station on Djebel Ouasch at 4,200 feet elevation. This circuit carried the bulk of operational and administrational traffic for the II Corps, the load reaching a maximum of 16,000 words per day, 12,000 with Algiers and 4,000 between the forward terminals. Due to the rapid movement of II Corps Headquarters and the great distances covered it was impracticable for wire circuit construction to keep up with the advance. Hence these radio relay circuits were vital to the operations.

From the opening of the Sicilian Campaign on 7 July 1943 until 9 August 1943 a duplex radio teletype circuit was operated between Sidi-Bou-Said and Malta with relay stations on Cape Bon and Pantelleria, a total distance of 243 miles, all over water. The longest span was that between Pantelleria and Malta, 148 miles. The station on Pantelleria was at an elevation of 500 feet and that on Malta 800 feet; application of the formula for line of sight gives seventy-two miles as the limiting distance but communications were good in spite of this doubling of the theoretical limit.

Radio relay was the main reliance between Anzio and Headquarters Fifth Army at Presenzano and this installation illustrates flexibility in the routing of radio relay. There is a high range of mountains on the direct route; these were in the hands of the enemy and therefore unavailable for radio relay sites. The solution was to place the relay station back near Naples, far in rear of both

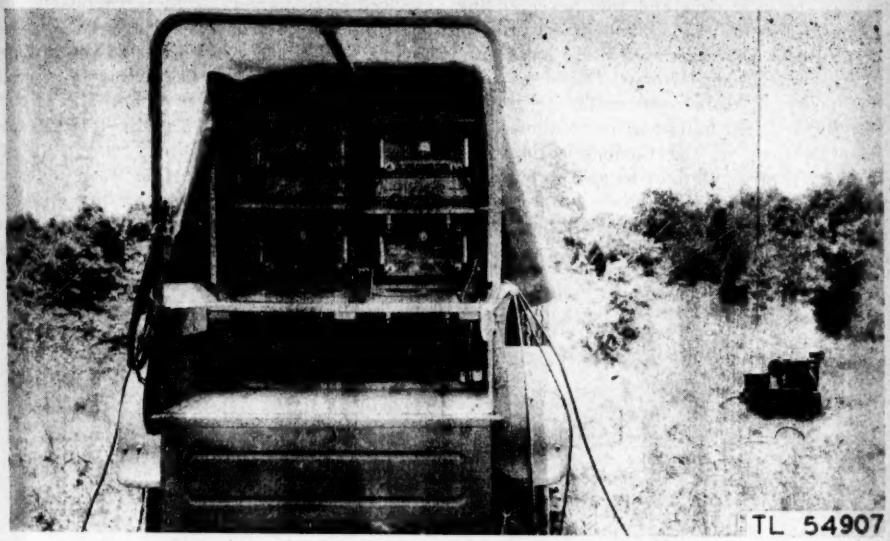

Figure 2.—Radio relay station in half-ton truck. The mast of one of the four antennas is seen in the right background; one antenna is for receiving and one for transmitting up the line and one of each for down the line. One of the two or more generators is shown to the right of the truck.

terminals but with a good line of transmission to each terminal. Traffic reached 20,000 words per day, furnishing instantaneous communications from Army to VI Corps and through the Corps teletype switchboard direct to the divisions in the Anzio operation.

Mention has already been made of the circuit acros sthe English Channel to the Normandy beachhead and of the sensation created by this first tactical use of multichannel radio relay. The Cross-Channel span was eighty-three miles although the calculated limiting distance for the 800 feet elevation of St. Catherines Hill and the 160 feet of the Normandy site is only fifty-eight miles. The value of these switchable telephone and teletype circuits and of the facsimile transmission of information and targets on aerial photographs was very great.

It became routine procedure early in the Normandy operations to install radio relay channels paralleling wire channels between Army Group and Armies and between Armies and their respective Corps. Whenever considerable distances separated Corps and Division command posts, radio relay channels were also used by Corps to assure communication with the distant Division command posts. There were hundreds of these forward area circuits installed. They were usually put in quickly, were operated as auxiliary circuits; sometimes, and especially immediately after a long move, as the sole speech circuits. When CP's moved again, these radio relay installations were pulled out and were reinstalled to serve the new locations in phase with the progress of the operations.

Radio relay was also vital for long circuits in the rear areas. Owing to battle damage and German demolition, it was frequently impossible to rehabilitate enough French, Belgian, or German cable or open wire circuits to carry the vast volume of message business. Radio relay proved an excellent solution, the sole solution in many cases, because priority in assignment of signal construction units was given the forward elements; their need for construction progressed

across the Continent and was never ending. From D-day to VE-day and afterward, the ETO Signal Office received daily pleas from Armies and Army Groups, "Send us more line material, more construction troops." A few construction units had to be allotted the Base Sections of the Communication Zone in order that they might be able to maintain the rear area lines on which supply to the front depended and in order that they might furnish communications to new ports and depots as the operations moved eastward, but there were seldom any construction units available to build new lines in the rear. Consequently, reliance had to be placed upon rehabilitated civilian lines. These were often too meager to provide the circuits required and when this was the case we often resorted to radio relay. There were radio relay circuits from Paris to Cherbourg, to Deauville, to London, to Nemur, and to Vittel. The Air Force also had a considerable network of radio relay circuits tying in from Headquarters at Chantilly, near Paris, to their Advanced Headquarters, to their Tactical Headquarters, to Bombardment and to Fighter Wing. The Ninth Air Force had the distinction of having the longest radio relay circuit in the ETO, that between Chantilly and Bad Kissingen, Germany. This circuit used two terminal stations and eight relay stations. The sum of the distances between stations was 410 miles and the direct air line distance between the terminals was 390 miles. In spite of the long distance and eight relays this circuit was "in service" about ninety per cent of the time.

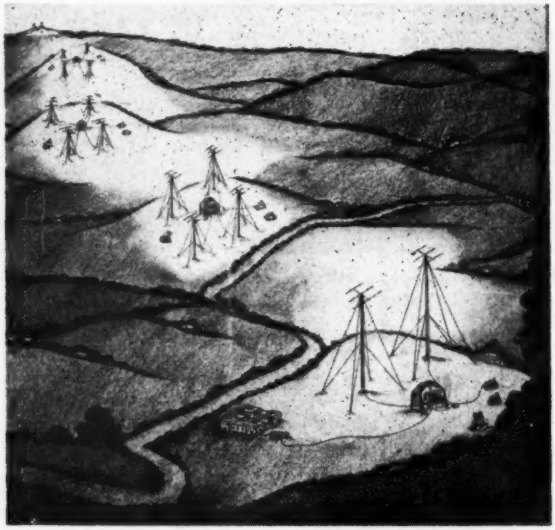

Figure 3.—Pictorial view of multi-channel radio relay system, showing two terminal stations, one in the right foreground and one on the skyline in left background and three relay stations between the two terminals.

Another use of radio relay resulted from a bitter experience at ETO Headquarters. Our big 40-kilowatt radio station for communication with Washington was located about twenty miles southwest of Paris. It was keyed from the Signal Center Blockhouse in Paris by French circuits in the Paris-LeMans cable. Unfortunately, this cable skirts the edge of the railroad yards at Trappes and this yard had been heavily bombed by our Air Force. French and

American cable splicers had repaired this cable when the headquarters of ETO moved from Valognes to Paris early in September 1944. The cable was put into service; the circuits operated well and we settled ourselves to what we hoped and expected would be an indefinite and uninterrupted use of the cable. We felt our U.S. link secure. But such was not the case. A heavy rain, a thorough soaking of the ground, moisture in the cable through two unsuspected cracks in the sheath and out went our vital keying circuits. The obvious remedy, and one quickly applied, was to place an additional radio relay station atop the Eiffel Tower, another at the big radio station, and thus to restore the direct keying circuits. Losing them once was enough. When the cable was restored we went back to wire circuits but we did not remove our radio relay paralleling link and it saved our Washington communications when the cable failed the next time. We learned in September 1944 that new troubles may occur at any time in a bombed cable. One might think that a thorough soaking would penetrate every crack or pin hole of a buried cable and that all prospective troubles might be thus revealed and repaired at one time; but such was not the case. A prospective trouble might survive the first heavy rain and succumb to the second or to the third or fourth. Troubles were unpredictable. Ability to bridge a gap, such as this twenty-mile link from signal center to radio station, was a most valuable asset to a signal officer and, in the ETO, we all tried to keep two or three radio relay stations in reserve for such an emergency.

Colonel Grant Williams, Signal Officer, First Army, thus describes the use of radio relay at Bastogne: "In November we had done some experimenting using the Radio Link, AN/TRC-3, in a moving vehicle. We had a complete terminal set with CF-1 and 2 carrier equipment and a teletype machine mounted in a truck. When it looked as if the 101st Division was going to be surrounded at Bastogne, the Corps Signal Officer (whose young assistants had done the building) sent the truck towing a trailer (with an additional terminal set as a spare installed) into Bastogne. It was the last vehicle to enter the town before the Germans completed their encirclement. The trailer was hit and destroyed. However, the truck was undamaged, and throughout the entire period until they were relieved, the Corps had telephone and teletype communication with General McAulliffe. Wire communications would have been impossible, as naturally the Germans would have cut the lines. Ordinarily, now, I keep the Radio Link as a stand-by, but whenever, due to line failures, the number of channels to any of my units falls below a fixed standard that I have set, the Radio Link is placed in service and remains in service until the wire facilities are completely restored. It is the best agency we have to meet the unusual, the unexpected and the difficult situation. Going back further, I may say that the rapid advance of late last summer across France and Belgium would have been much more difficult and certainly slower if we had not been able to maintain an adequate scale of communications by its use. Never had field armies like the First and Third had communications on such an adequate and successful scale, entirely due to unimaginable hard work and such equipment."

Radio relay was also valuable in the Pacific. Used at Hollandia in May 1944, it furnished circuits quickly. While the links involved were short (six, two and fourteen-mile jumps) the terrain was rugged or swampland and the roads were narrow; the radio relay circuits served well until replaced by pole lines. Prior to the Leyte landing, several small ships had been allotted as floating communication centers and had been equipped with radio relay and associated carrier equipment; also a 1½-ton truck had been made into a radio relay terminal. At H+2 hours, LCM's carrying this truck and additional radio relay equipment for other shore-based stations, headed for Red Beach; within twenty-five minutes the truck station was in communication with the ship stations. At H+5 hours, General MacArthur went ashore and made his famous "I have returned" broadcast. This speech was picked up from shore by General Headquarters afloat

and was rebroadcast to the Philippines. A Signal Corps communication ship recorded the broadcast and it was retransmitted to the United States later that day. Twenty-two radio relay terminals were used in the Leyte operations, handling telephone and teletype operational traffic and broadcasts.

In preparation for the Luzon operation, six 2½-ton trucks with trailers were fitted as mobile radio relay terminals; these performed indispensable service in the landing at Lingayen Gulf and in the subsequent rapid advance to Manila. Dagupan, twenty-five miles to Camiling, twenty-seven miles to Tarlac, twenty-four miles to San Fernando, twenty-two miles to Malolos, thirty-two miles to Manila, each was first the forward terminal and later, by back-to-back installations, became the relay station along the route of reconquest. By 10 March 1945, sixteen radio relay terminals were handling seventy-five percent of voice and teletype traffic in and out of Manila to remote points on Luzon.

These examples show that in World War II, radio relay has furnished thousands of vital circuits which could not have been provided as quickly by wire construction even though our forces had been provided unlimited numbers of signal construction troops and even though these troops had been given "clear the road" priority for bringing up their poles and wire. Four battalions, a total of 1,820 men, would require about ten days to construct a four-wire pole line one hundred miles long; radio relay teams totaling forty-four men can install their equipment and provide equivalent circuits in less than two days. These figures—2 days against 10; 44 men against 1,820; 88 man-days against 18,200—show why radio relay, competing for the title against many items of new and marvelous communication equipment, both wire and radio, is called the communication sensation of World War II.

With the great strides being made in the means of making war, whereby an enemy may strike swiftly and in great strength, I feel that we should have the means to insure better and quicker action. On my experience as a combat commander in the field only, I am convinced that we must have unified command in time of war. That experience, viewed against the background of varied service during the peacetime years when it was my responsibility to participate in the training of our ground forces, impels me to conclude that unless there is unity of control at the top in peacetime, there can be no immediately effective unity of field command in wartime. In peacetime the theaters of war cease to exist and the domestic establishment becomes the principal military agency. The form of the home organization becomes even more important in peace than during war when pressure and the necessity for survival forces cooperation. It is inconceivable to me that there can be any serious question as to the need for unity of administration and direction at the top in the form of a single executive department to preside over three fighting arms which exist only for a single purpose—the national defense.

—General Omar N. Bradley

Antiaircraft All the Way

Prepared by Office of the Assistant Chief of Staff, G-2
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THIS story opens in the Philippines with the March day in 1942 on which General Douglas MacArthur, with the skeleton staff of a scattered army, boarded a PT boat bound for Australia. In the General's mind there was shaping a plan to build from scratch a war machine that would fight its way, step by step, across thousands of miles of jungles, coral beaches, and water along the "long road back".

With General MacArthur on this unhappy cruise was Major (then Brigadier) General William F. Marquat, who had commanded the pitifully inadequate antiaircraft defenses on Bataan and Corregidor. He was already beginning to conceive the nucleus of a plan for the mighty organization which was later to become the 14th Antiaircraft Command.

The epic of the Pacific struggle will be years in the recording; when complete it will reflect the careful parallel of the history of antiaircraft in the theater with that of the general prosecution of the Japanese War. For during the whole long conflict, there has been no major airfield operated without adequate antiaircraft defense; no major landing without antiaircraft participation; and no base, however obscure, without antiaircraft protection.

It is not intended that this article confine itself to signal individual acts of heroism, though antiaircraft has had its share of heroes. No antiaircraft artilleryman feels he has won the war himself, but all of them know that they have played an important part in bringing about the final victory against the empire of Nippon. It is hoped that the experiences undergone by units in the Pacific will benefit artillerymen to come. Difficult problems were encountered and solved when this war of sea and jungle was young; techniques of expediency were developed under the pressure of tropic terrain and the constant shortages of equipment and troops. Matériel and men were used in many and varied ways far removed from their primary functions.

The Antiaircraft Mission

Less than three months after Pearl Harbor, antiaircraft artillery units were among the first shipments Pacific-bound. These units were only partially trained; token troops sent to assist Australia in defending herself against threat of invasion while her own sons were battling Rommel on the sands of El Alamein and Tobruk. The initial force consisted of two brigade headquarters, one mobile and two semi-mobile regiments, and three separate semi-mobile automatic weapons battalions. All the units except the mobile regiment were National Guard. That regiment had but recently been activated, and was officered, in the main, by newly called-up reserve officers. The battalions had just completed their first record fire; they had been issued new and untried equipment at the port of embarkation; and they were sailing to fight an enemy whose fighting power had been clearly shown.

Shortly after they landed, the 102d Antiaircraft Automatic Weapons Battalion participated in the first airborne movement of antiaircraft artillery under combat conditions. Using Dutch, Australian, and American airplanes of all types and sizes, the battalion was flown from Brisbane to Port Darwin. In May, the 101st Antiaircraft Automatic Weapons Battalion reached Port Moresby. The remaining units were in position at strategic points on the threatened Australian mainland. At that early stage of the war, the supply routes were long and shipping was scarce; these conditions persisted throughout the war, and made necessary the development of many adaptations and changes in tactics in the Pacific Theater.

A continuous state of alert was maintained at the time. The paucity of antiaircraft troops available did not permit withdrawing

any units for training under such conditions. Such training as existed was done at the guns while they were in combat position. Unit schools were conducted, and "instructor" schools, attended by battalion representatives who were to go back and train in their own organizations, were established.

While this training was in progress in 1942, the 37-mm antiaircraft gun was replaced by the 40-mm Bofors. Units received the new guns and ammunition, but training manuals had not been forwarded. Officers, coordinating with Australian gunners familiar with the Bofors, developed a training manual of their own, and the guns were operating against Japanese planes before the official publications reached the theater.

After the Battle of the Coral Sea and the landing of the Japanese at Buna, it was evident that New Guinea was to be a major battleground. Port Moresby was the main operational base of the Fifth Air Force, and antiaircraft artillery defense of the area was needed; however, the invasion of Australia was still a threat. Thus, another expedient, that of the composite battalion, consisting of a single gun battery, two automatic weapons batteries, and a platoon of searchlights, was developed for use in *major* operations. Less important strips had to be satisfied with an automatic weapons battery. At this time, the primary mission of the antiaircraft was the defense of landing strips against enemy air attack. The defense of supply installations had second priority.

After the battle for Buna was over in December 1942, Allied forces at last grasped the initiative. Antiaircraft defense of the beachhead, the installations, and the perimeter was recognized as a necessity in every assault operation; antiaircraft units were included in every task force. Goodenough Island, Lae, Arawe, Manus, Hollandia, Biak and Morotai, as well as Leyte, Luzon and the other islands in the Philippines saw antiaircraft artillery on the beach and in action on D-day.

Farther east, in the South Pacific Area, antiaircraft units at Guadalcanal, Bougainville, and on the Green Islands were in action against the Japanese, faced with the same privations, the same shortages of men and equipment as were the antiaircraft artillerymen in New Guinea.

As the war progressed and as shipping became available, additional antiaircraft battalions, well equipped and highly trained, arrived in the Pacific. After a short period of acclimatization, they were committed in the operations that now were carried out by large task forces instead of the small combat teams of the early days.

The total score for antiaircraft artillery in the Western Pacific from the arrival of the first troops in Australia during March 1942 to VJ-day in September 1945 was:

Total enemy aircraft destroyed—506

Total enemy aircraft probably destroyed—270

This score is in no measure a true picture of the effectiveness of the antiaircraft artillery and searchlights, however. Statistics will never be able to show the number of raids turned back and the number of incompleted and inaccurate bombing runs due to flak; they will never show the number of raids canceled or not attempted because of the mere presence of antiaircraft.

Other factors affected the engaging of what few targets there were. In many cases condition "hold fire" existed because of the presence of friendly fighters. In other cases, Japanese pilots were apparently well briefed in the capabilities and maximum ranges of American weapons and flew at altitudes which our projectiles could not reach. A technique of precision fire was adapted in order to make each round count. The one or two plane raids so often experienced put to the test the accuracy of antiaircraft gunnery. Barrage fire, even had it been possible, would not have been effective against so few aircraft.

As the war progressed into territory wrested from the Japanese, the question of "operational control" arose. The demands of the Pacific Theater developed a unique system of exercising that control. This system was determined by two primary factors:

a. The scarcity of antiaircraft units, and

b. The early exclusive employment of antiaircraft to defend Air Force installations.

An offensive land operation necessitated antiaircraft protection. Yet the operations were directed at enemy occupied areas where the air strip was of major importance. It could then be assumed that, when ground forces had captured these fields and the strips were again in operation, antiaircraft artillery would undertake their defense. But at the same time, antiaircraft would be needed to defend rear areas used for staging and supply points, likely targets for air attack. A maximum use had to be made of the few units in the theater so the luxury of organic assignment of antiaircraft units to Army, Air Force, or Service of Supply was considered impractical.

The 14th Antiaircraft Command under the guiding hand of Major General William F. Marquat, long experienced in the Pacific war, was activated to assist in the clarification of this problem. All antiaircraft artillery units then were assigned to the command and attached to the using major unit.

By this method, an antiaircraft artillery battalion might land on the beachhead on D-day attached to the Sixth Army. After ground troops had taken the strip, and after the Air Force had commenced operations from the area, the same battalion might be detached from Sixth Army and attached to Far East Air Forces for operational control. As the situation became more stable, the use of the strip might be discontinued, and perhaps priority for defense of the supply facilities maintained at the base would be established. The Service Force present would then assume operational control. This method insured antiaircraft defense where it was most needed.

Training Techniques

The method of attachment to Army, Air Force, and Service of Supply, discussed above, developed a unique system of training in the Pacific Theater. Antiaircraft artillery units in the early days remained over extended periods in isolated areas; they were not sufficiently numerous to permit the withdrawal of entire units for training purposes. Too, the necessity for the standardization of techniques throughout the theater was paramount since attachment of the same unit to various major commands made a single method of procedure mandatory. To insure that training was conducted along proper lines, itinerant instruction teams were formed. These teams visited units in combat position. They explained to those who needed it most, newly developed techniques. This method, originated as a child of necessity, was found to be of invaluable assistance to units in forward areas and continued in force after a more formal Training Center had been established.

In May 1944, at the direction of General Marquat, the 14th Antiaircraft Command Training Center was established at Finschhafen, New Guinea. Units arriving in the theater were brought there for acclimatization to tropical warfare. There, on the terrain in which they would have to fight, units were trained in gunnery, care of equipment, and jungle warfare. They trained and at the same time took their turn in manning the positions which constituted the antiaircraft defense of the Finschhafen area. While some units searched the skies for the enemy, other units were firing at towed targets or radio-controlled target airplanes. Schools were conducted for staff officers and technical specialists. Antiaircraft units trained intensively, and when their training cycle was completed, they went into combat equipped and efficient in the waging of war peculiar to the Pacific. The rapid development of new methods and improved matériel posed training problems. The rugged, jungle-matted terrain and the vast expanses of sea to be traversed forced antiaircraft artillerymen to develop new techniques continuously. Shortly after the first antiaircraft units arrived in Australia in 1942, methods of loading 40-mm guns and searchlights into aircraft were perfected in order to get matériel into the inaccessible combat zones of New Guinea where it was so urgently and immediately needed. These first experiments had to be carried on in forward

areas, between air raids, with all the handicaps of mud, rain and heat, on difficult and unsuitable terrain. As the war continued, research activities were intensified. The experience of the men who were battle-wise from constant combat against the Japanese, was pooled with the efforts of men new to the theater but well versed in the latest techniques that had been developed in the United States. The sum total of their energies brought forth new uses of equipment and improved methods of procedure needed in tropical warfare. Such an innovation was a mobile operations room that could be easily loaded and quickly set up on the beach in an amphibious landing.

Research and training in early warning and coordinated fire direction were carried on continuously; and as a result, antiaircraft gun crews were less and less often left unalerted until after the first bomb had landed. In the fall of 1944, Antiaircraft Operations Detachments, trained and equipped to install and operate Antiaircraft Operation Rooms and to coordinate Antiaircraft Artillery Intelligence Services arrived in the theater and began to take part in major operations.

Secondary Missions

a. Antiaircraft Armament.—From time to time antiaircraft artillery already performing its primary mission, the destruction of enemy aircraft, has been called upon to execute many other functions that were thought to be possible in times of emergency, but generally, were not considered normal. In Townsville, in 1942 when Japanese invasion of the Australian mainland was imminent, Major General Marquat, battle-wise from his experiences in the Philippines, saw to it that all antiaircraft guns in the vicinity of the harbor were in a position permitting them to bring fire on enemy shipping.

At Milne Bay in August 1942, the airborne 709th Machine Gun Battery met an attack of Japanese marines at Strip No. 3 and turned them back with their cal .50 weapons. This marked the first of the long series of ground actions where antiaircraft artillerymen used the weapons of their branch against enemy ground troops. In September 1943 at Nassau Bay, a battery of the 209th Antiaircraft Automatic Weapons Battalion fired the barrage that permitted elements of the famed 41st Infantry Division to take Roosevelt Ridge, a position that the enemy had stubbornly defended for three days. At Momote Strip in the Admiralty Islands, in February 1944, antiaircraft automatic weapons were used to repel an enemy "Banzai" charge. There a sergeant cut the top off a palm tree with a cal .50 antiaircraft machine gun on an M51 mount in order to "eliminate" a sniper. That same night, caught outside the perimeter, the antiaircraft artillerymen of Battery A, 211th Antiaircraft Automatic Weapons Battalion, repelled a Japanese surprise attack. At Biak, the group headquarters, moving its position twice, spent the night outside the perimeter with the antiaircraft guns of its battalions firing alternately at enemy air and ground targets.

In these cases antiaircraft equipment was used against enemy ground attack either as a matter of necessity as at Milne Bay, or as an experiment, as at Roosevelt Ridge. It was not until the action on Luzon that weapons meant primarily for defense against air attack were used in offensive action against ground targets according to preconceived plan. There, maintaining close coordination with infantry units, antiaircraft served effectively as field artillery, closing caves and destroying designated targets with accurate fire.

The results speak for themselves:

(a) Twenty-two days of firing in Balete Pass on Luzon by a detachment of 90-mm guns:

75 caves closed
40 pillboxes destroyed
7 machine guns destroyed
13 buildings destroyed
3 vehicles destroyed
25 gun positions knocked out
75 support missions of unobserved harassing fire.

(b) Fourteen days of firing in the hills west and northwest of Cebu City on the island of Cebu by a detachment of 40-mm guns:

7 tunnels blocked
1 CP destroyed
3 OP's destroyed
4 supply dumps destroyed
3 mortars knocked out
17 dugouts reduced
77 pillboxes reduced
10 huts demolished
29 machine guns silenced
7 trench systems reduced
2 automatic rifles knocked out.

b. Searchlights.—In addition to their main function of searching the skies for enemy targets, antiaircraft searchlights have been used to provide beacon lights for friendly aviation, and to illuminate battlefields for ground action. Pairs of searchlights, carefully placed at intervals of from one to two thousand yards, covered an entire division front with "artificial moonlight." They prevented enemy infiltration and "banzai" charges, decreased the enemy's use of grenades, and made it possible for the medics to evacuate the wounded hours earlier than otherwise would have been possible. Perimeter defense was made easier and "trigger happiness" was reduced to a minimum. Enemy troop movements, that had been planned to take advantage of inclement weather, were clearly seen up to a distance of 200 yards. The worse the effect on the enemy, the more the morale of the infantryman was boosted.

c. Radar.—One of the most interesting developments that took place during the last months of the war concerned the use of radar against ground targets. The 14th Antiaircraft Command began research work on vehicle detection at Finschhafen, New Guinea, in May. Further experiments led to successful development of techniques for locating enemy mortars and artillery. This would have been a considerable contribution to the organized countermortar intelligence coordination that was being strongly emphasized in the summer of 1945. Specially trained teams were organized for mortar location by radar to work for the Sixth Army. MTI (Moving Target Indicator) equipment arrived from the United States in August and the 14th Antiaircraft Command was conducting tests to determine its full capabilities when the war ended.

Conclusion

Antiaircraft artillery was one of the senior branches in the Pacific. Developments within the theater of operations brought it from a purely defensive role to that of an offensive arm, landing early in amphibious operations and fighting the enemy on the land and in the air. Units conducted training and accounted for enemy airplanes simultaneously. The story of antiaircraft in the Pacific is one of which those who wear the insignia of crossed cannons and shell can well be proud.

During war, the manpower requirements of the armed forces are paramount, but this does not mean that there is no limit to their wartime numerical strength. Our requirements must be realistic—weighed in the light not only of military necessity, but of the demands of industry and the civilian economy. Once the total available military manpower is determined, it must be properly allocated, both in quantity and quality, to the several services in accordance with their respective missions—and these allocations must be altered from time to time in keeping with the changing aspects of the war. Above all, there must be a ceaseless and vigilant insistence upon economy and efficiency in the use of the allotted manpower.

—Major General Miller G. White

Use of Heavy Bombers on Tactical Missions

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A great deal has been said for and against the use of heavy bombers on tactical missions. A tactical mission is one flown in close cooperation with ground troops, and that type mission is usually assigned to the Tactical Air Force and not the Strategic Air Force. However, heavy bombers have been used successfully in this role. The decision to use strategic bombers must be a command decision, and the desired results must be weighed carefully against the possibility of bombs falling among our own troops.

The first large-scale operation by heavy bombers, bombing just ahead of our own troops, came in the invasion of Europe on D-day. On that day the heavy bombers bombed the beaches while flying above a solid overcast of clouds. While a carpet of bombs placed in front of the advancing troops was highly desirable, the danger to our own soldiers from bombs dropped without visibility of the ground demanded the most careful consideration.

How had the heavy bombers been able to bomb through the overcast and what had convinced the ground commanders that they could do it without endangering their troops? If it had been necessary to make the decision several months earlier it is likely such a project would have been abandoned. Eighth Air Force bombers had been known to miss the target by wide margins using through-the-overcast technique. However, in preparation for D-day, against the possibility that weather would prevent visual bombing, specially-selected navigators and bombardiers had been trained in radar bombing technique, and repeated tests had been conducted against shoreline targets. These tests showed that accuracy was possible, and that the greatest menace to the safety of friendly troops was the danger of inadvertent and premature bomb releases. This risk was carefully weighed by the ground commanders against the advantage of a bomb carpet to clean their assault path. Confronted with photographic evidence of the accuracy of bombing tests, they elected to take the risk. Here was the command decision to use heavy bombers.

If the decision to bomb ahead of our troops through overcast was breath-taking in its boldness, the results were epochal. A short distance offshore lay the LST's and other craft carrying the invading force. Confident of cooperation from planes they could not see, the men of the assault wave started ashore at the precise instant established beforehand. Exactly on schedule the first wave of bombers came over, laying its bombs on the shoreline and proceeding inland. The entire force of bombers had to clear the attack point within five minutes or run the risk of dropping bombs on friendly forces. Precisely according to plan the heavy bombers performed their mission, laying their carpet of bombs before the attacking Allies. So effective was their bombing, and with such a minimum of damage to friendly forces was the operation carried out, that many lives were saved. Ground commanders were firmly convinced. They now had another weapon at their disposal when the need arose.

The need arose for the heavy bombers in the American breakthrough at St. Lo. They were needed to carpet-bomb on the frontage of the ground attack with the object of destroying or paralyzing enemy forward defensive positions to a depth of 2,000 yards.

A rectangular area 7,800 yards by 2,250 yards on the frontage of attack was given as the bombing target and was marked with red smoke. The general-purpose bombs used were fuzed-tail instantaneous, and the nature and density of the cratering did not obstruct the advance of our own troops. Non-cratering fragmentation bombs were also dropped. Cratering was accepted in one zone, a rectangle 1,500 yards by 1,000 yards around St. Gilles, south of the main area which was bombed.

As a safety precaution our troops were withdrawn from their forward positions to a line 1,200 yards north of the target immediately prior to the heavy bombing attack. To do this involved a risk that the enemy would take advantage of the withdrawal to move forward into the area abandoned, thus avoiding the bombardment and being in a position to delay the commencement of the subsequent attack. Our artillery had to be prepared to prevent this.

The attack was carried out by more than 1,000 heavy bombers of the Eighth Air Force. The area was fairly uniformly covered and the effect upon the enemy was considerable. Although the number of casualties caused, and vehicles and guns destroyed, is not believed to have been high, resistance in the area was negligible and the fact that our ground forces were able to advance rapidly in their breakthrough more than justified the use of heavy bombers.

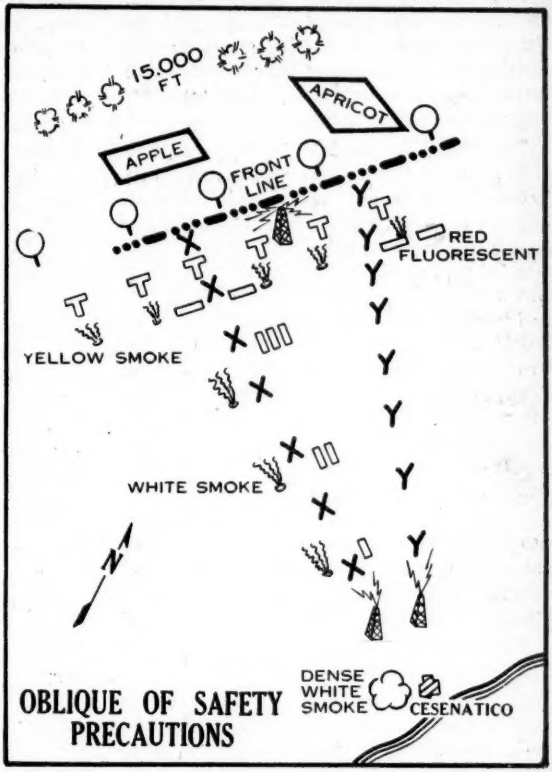
Other tactical missions that have been assigned heavy bombers are:

1. Bombing of specified areas behind the forward hostile defensive system with a view to paralyzing gun areas, destroying communications, and isolating enemy forward troops from their rear echelons.

2. Bombing of defended areas on the flanks of the advance, leaving a suitable avenue for the advance of our own troops.

3. Destroying enemy headquarters, concentration areas, or dumps within a few miles of his forward troops.

The uplift to the morale of our troops in witnessing heavy bombing attacks immediately prior to carrying out an operation is greatly diminished if our bombs fall within their lines and kill some of their comrades. Identification and marking of front lines has always been one of the drawbacks when heavy bombers are used in operations close to our own troops. The ultimate in safety precautions was reached by the Fifteenth Air Force in Italy in cooperation with the spring offensive of the Fifteenth Army Group.



OBLIQUE OF SAFETY PRECAUTIONS

This operation brought to the peak of success the use of heavy bombers in a tactical role in Italy. A total of six missions were flown in support of the Eighth and Fifth Armies in their final offensive against the Germans. The first mission was flown on 9 April and the last mission was flown on 19 April. During this period 7,152 heavy bombers were airborne and 6,308 aircraft completed effective sorties to drop a total of 9,250 tons of bombs.

In order that the risk to our own troops

would be at a minimum, it was decided that any targets selected for heavy bomber attack should be at least 3,000 yards from Allied forward positions. The targets selected in the Eighth Army sector were areas that were densely occupied by enemy troop concentrations and gun installations. In the Fifth Army sector, most of the targets were more precise and included supply and ammunition dumps, enemy troop concentrations, and German Army Headquarters.

The two areas selected for the attack on D-day were designated Apricot and Apple.

The initial point—that point in the air where units making up a bombing formation deploy to carry out their assigned missions—selected for attacks on the Eighth Army front was Cesenatico, on the Adriatic coast. The two initial points selected on the Fifth Army front were in the vicinity of Pistoia and Prato. The axis of attack selected for the Eighth Army front was 302 degrees, while the one for the Fifth Army was 05 degrees. In both cases the axes were generally perpendicular to the front line of our troops.

Elaborate safety plans were made to prevent our bombs from falling on friendly troops. The three types of safeguards available, all of which were used to the fullest extent, were radio aids, visual aids and preattack familiarization flights.

For the attack on the Eighth Army front the following visual aids were used:

1. Heavy concentrations of white smoke were laid at a pinpoint adjacent to the initial point Cesenatico, beginning fifteen minutes before target time.

2. Three sets of ground markers were displayed at pinpoints along the bomb run as follows:

a. One white bar, 100 by 50 yards, at Savio River.

b. Two white bars, each 100 by 50 yards, on the Ravenna-Forlì highway.

c. Three white bars, each 100 by 50 yards, on the Ravenna-Faenza highway.

White smoke was placed downwind from each bar location in order to draw attention to its position.

3. The front line was indicated by a series of white "T" letters 100 yards in length and spaced 1,000 yards apart along the whole front of area Apple and as close to the Senio River as the forward positions of our troops would allow. Yellow smoke canisters were located along the line of the "T" letters to aid in their recognition.

4. Small, red fluorescent panels were located in front of areas Apricot and Apple.

5. An indication line of antiaircraft shell bursts marked the highway from Faenza to Bagno Cavallo as follows:

a. Three lots of four bursts 300 yards apart were fired opposite each target. One lot of four bursts was fired opposite each end of each target and one lot of four bursts opposite the center of each target. Shell bursts were fired in salvo at thirty-second intervals at 15,000 feet above sea level.

6. One other very important safety precaution was taken. All bomb bay doors were opened over the Adriatic Sea before approaching the initial point in order to prevent bombs from dropping on Allied troops as a result of a bomb rack malfunction.

Visual aids used on the Fifth Army front were much the same as those used on Eighth. While the physical location of the aids was different, their relative location with respect to the battle front was the same.

As a means of "last resort" cancelation of the heavy bomber attacks in addition to routine recall methods, a VHF forward radio control was set up at Tactical Air Command Headquarters, Eighth Army. VHF Channel "A" was monitored by all bomber formations. In addition, on the Eighth Army front, flak bursts forming the letter "X" over the initial point of Cesenatico at 15,000 feet would also indicate that the heavy bomber attacks had been canceled.

In addition to visual aids employed, a radio marker system of SCS 51 was installed. The "V" frequency indicated a line perpendicular to the axis of attack and ran just behind and

roughly parallel to the Allied front lines. The "X" and "Y" frequencies marked parallel axes of attack to the target areas Apple and Apricot.

In order to insure positive identification and precise navigation to the target, lead bombardiers and navigators of each group were supplied with oblique photographs of the target areas and flown over the bombing course in P-38 droop-snoots for a first-hand study of the initial point. Droop-snoots are modified P-38 aircraft with space for one passenger in the nose in place of the guns. A plexiglass nose section provides excellent visibility for the passenger. The bombardiers whose targets were in the Apple and Apricot areas were given two flights over the course because of the proximity of these areas to the front lines. These were the pre-attack familiarization flights mentioned earlier.

While these may seem like elaborate precautionary measures and a great deal of unnecessary work, they are necessary if heavy bombers are to be used on tactical missions.

The results of the bombing were generally excellent and ground commanders paid high tribute to the work of the Fifteenth Air Force in support of the attack. One German officer said, "The effect on the morale of our troops was indescribable. We know now that you mean business in Italy and that we will not be able to stand up to these terrifying attacks much longer. I believe that my men were quite content to be taken prisoner a few days after this last raid."

To use heavy bombers successfully on tactical missions the air force planners must have full knowledge of the ground situation and the proposed operations. They must be allowed to suggest targets and to reject targets not considered suitable. Air and ground must do the planning for the operation together. Liaison officers should be at the highest army headquarters from the time of the initial planning stages until the last sortie has been flown. In turn, army ground planners should be aware of the power and limitations of heavy bombers. They should also be aware of the flexibility of all types of air power. Then, and only then, can the highest degree of air-ground cooperation be achieved.

The reasons which impel me to conclude that we must now establish a single executive department to preside over three coequal and autonomous fighting arms are:

1. **Essential in order to have a well rounded military program.**
2. **Not feasible to arrive at proper size and composition of each arm.**
3. **Training for national security must be under single direction.**
4. **Era of atomic weapons makes unity and training more necessary than ever.**
5. **Necessity for pooling of talent in field of scientific research.**
6. **Need for economy and to prevent extravagance and overlapping.**
7. **Lack of integration of three members of fighting team, postwar security will become a patchwork of improvised ideas.**
8. **Modern war demands teamwork and unity at the top will show our soldiers the essential truth that each wears the uniform of the nation's fighting forces and that a man's natural friends, trusted associates, are the others who wear that uniform regardless of color or design.**
9. **Finally there is no such thing as a separate land, sea or air war; therefore we must now recognize this fact by establishing a single department of the armed forces.**

—General of the Army Dwight D. Eisenhower

Rehabilitation of Military Prisoners

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THE United States Army does not forget about soldiers when they are sentenced by General Courts-Martial, but makes an effort to retrain them and restore them to duty as useful soldiers and civilians.

This concept is a relatively new one among armies of the world. Formerly, when soldiers committed serious military and other crimes while serving in the armed forces of a nation, they were sentenced by a General Courts-Martial or similar tribunal to long prison terms and ultimate dishonorable release from the Army.

In 1915 a step forward was taken by the formation of the United States Disciplinary Barracks (USDB) at Fort Leavenworth, Kansas, from the military prison located there. Its purpose was to retrain prisoners sentenced to long prison terms and dishonorable discharge, and restore worthy individuals to duty as honorable soldiers.

Early in World War II it was realized that many general prisoners could, by further military training and education, be restored to useful service within a few months. Also, there was a good possibility that a high percentage of those so restored would not become second offenders.

The only army penal institution which the United States Army possessed at the start of World War II was the USDB at Fort Leavenworth, which it had taken back from the Department of Justice in 1940. Obviously, this institution was inadequate for retraining of the large number of general prisoners which could be expected from an army of 11,000,000.

Realizing the importance of retraining or rehabilitating general prisoners, the Under Secretary of War called a conference at Fort Leavenworth in November 1942, for the purpose of discussing methods and facilities to be used in rehabilitating general prisoners. Among those attending the conference were the Commandant, Fort Leavenworth; Commanding General, Seventh Service Command; the Acting Adjutant General of the United States Army; Commanding Officer of the USDB, Fort Leavenworth; and noted civilian authorities from federal and state penal institutions. Also, there were representatives from all the Service Commands in the continental United States, except the Third and Sixth.

From the conference at Fort Leavenworth came a plan for standardization of all the rehabilitation centers as to organization and operation.

The rehabilitation centers, which had been authorized by a letter from the Office of the Adjutant General on 28 October 1942, were established and ready for occupancy by 1 December 1942, and their organization and function was patterned after the USDB in Fort Leavenworth. In them were incorporated all the suggestions which came out of the November 1942 conference at Fort Leavenworth.

The rehabilitation centers grew and did a good job. However, with the movement of large numbers of troops overseas in 1943 and 1944, the usefulness of some declined, and of others increased. Troop training areas were shifted until there were many in some Service Commands and very few in others. Accordingly, some rehabilitation centers were overloaded and others almost empty.

Other factors entered into the population of the rehabilitation centers. They eliminated short term prisoners, and long term ones were sent to the USDB. Overseas, rehabilitation centers were established within communications zones in the theaters, and nearly all returning prisoners were, as a consequence, scheduled for confinement in the USDB.

As a result of this shift of personnel from rehabilitation centers to the USDB, some of the rehabilitation centers closed, and the USDB acquired a larger and larger population. When it became obvious that the fa-

cilities of the USDB were no longer adequate for this increase of prisoners, a plan was evolved for formation of branch USDB's in various parts of the United States.

As of 15 August 1945 there were eight branches of the USDB in operation. Plans had been laid to open two others by 1 October 1945, making a total of ten by that date. The branches to be in operation by 1 October 1945 were: The Eastern Branch; the Southern Branch, the Northwestern Branch; the Midwestern Branch; the Southeastern Branch; the Southwestern Branch; the Northern Branch; the Central Branch; the East Central Branch; and the Northeastern Branch.

The operation of all army penal institutions and the study of all army prisoners in federal penitentiaries is the responsibility of the Correction Division in The Adjutant General's Office. The institutions themselves are under the administrative command of the Service Command in which they are located. The Correction Division exercises staff supervision and suggests methods for their organization and functioning.

Organization of the USDB at Fort Leavenworth is functional. It is organized to accomplish a particular job, and its organization is peculiar to that job. The following departments appear in the USDB:

First Disciplinary Barracks Guard Company
Supervisor of Prisoners Department
Quartermaster and Supply Section
Education and Rehabilitation Department
Farm Colony
Religion Department
Station Hospital
Psychiatry and Sociology Department
Administrative Department
Disciplinary Company
Laundry Department
Parole Department
Sub-School, Bakers and Cooks

All rehabilitation centers and branches of the USDB are organized along the same lines as the USDB at Fort Leavenworth. They will differ somewhat in internal arrangement and organization, but the same basic pattern is found in all of them.

Since the first function of the USDB, its branches, and the rehabilitation centers is to retrain general prisoners so they may again become useful soldiers or civilians, a great deal of individual consideration is given to each prisoner. He is received, his past history studied, and he is assigned to military training or to a job in the particular installation he is in. All during his confinement, he is continually studied by his supervisors, and by the psychologist and psychiatrist to determine when or if he may be released. As soon as it is determined a prisoner can again serve his country as a soldier or a civilian, he is considered for release.

This system of rehabilitating prisoners has proved a success. Of 33,450 committed to rehabilitation centers from their inception to 15 August 1945, 13,329 were restored to military duty. Of 18,881 committed to the USDB and its branches from 1 December 1942 to 15 August 1945, 2,051 were restored to duty. Of all restored, only 11.3 percent were returned as second offenders to rehabilitation centers. Only six and a half percent were returned as second offenders to the USDB and its branches from 1 July 1943 to 15 August 1945.

Within this system, we have another example of the operation of a democratic army. Prisoners, who were formerly considered to be losses to the Army and a liability to the country, have been considered as individuals, retrained and re-educated. The results speak for themselves, and we can look to the future when many thousands of prisoners now confined in the USDB, its branches and the rehabilitation centers, will again be serving their country as useful soldiers or civilians with a new outlook and a new conception of their responsibility in living with others.

As to the system itself, it will be subject to change with the coming of peace. The number of branch USDB's and the number of rehabilitation centers to be continued, together with the length of their continuance is dependent on the number of general prisoners received during the months before

demobilization is completed. However, the system in its general outline will continue until the changed conditions of a smaller peacetime army cause a reorganization for more efficiency in dealing with the problems which then exist.

Malaria Control Overseas

MALARIA was an acute problem among troops in the tropical theaters during the first two years of the war. The early campaigns in New Guinea and the Solomons were fought with inadequate antimalarial supplies and without proper preparation to control mosquitoes. For a time, casualties from malaria in the Pacific were eight times those from Japanese action. High malaria rates prevailed also among troops operating in tropical Africa and in India-Burma. It became urgently necessary to establish an organization of specially trained personnel to study and combat this disease.

In February 1943, the special medical malaria control organization began to function in the field. Twenty-eight survey and forty-nine control units had been activated, trained, and shipped from this country by the end of 1943. Six other control units were activated locally in overseas theaters. At the end of the war a total of sixty-eight survey and 146 control units were functioning in theaters of operation; also, more than sixty Medical Department officers had been assigned as malariologists. The total personnel especially designated for malaria control overseas was thus about 345 officers and 2,350 enlisted men. These men served as a dynamic nucleus for malaria control activities. Thousands of native laborers were employed under their direction. Also, they aided in the malaria control training of troops and supervised the work of unit antimalarial details. The mission of the malaria control organization has included the prevention of other insect-borne diseases as well as malaria—in particular, dengue, scrub typhus, and filariasis. Because of their special training, malaria units also have been used to assist in the control of certain other diseases such as schistosomiasis and those spread by rodents.

The situation in regard to malaria in the last two years of the war improved vastly in spite of the fact that operations continued in highly malarious territory and involved larger numbers of troops. Malaria rates dropped dramatically after their peak in June 1943. Losses from malaria were reduced to point where they were not a significant influence on military operations. The decisive factor in bringing about this reduction was the activities of the special medical malaria control organization. The survey and control units accomplished remarkable facts of mosquito control, not only in base areas but also, frequently, in forward zones. Moreover, the organization contributed greatly to the improvement of malaria discipline among troops, especially in the taking of suppressive atabrine, which was a highly important factor in reducing the noneffective rate. In most theaters the drop in malaria rates paralleled closely the building up of the malaria control organization. The Army's experience has demonstrated that an organization specially trained and equipped for malaria control and specifically assigned to this duty is essential for the effective control of this disease, which has been the greatest hazard, medical or otherwise, to military operations in the tropics.—*From an article in the "Bulletin of the U.S. Army Medical Department," November, 1945.*

Ship Damage vs. Air Attack

CAPTAIN M. R. BROWNING, *United States Navy*
Instructor, Command and General Staff School

NO seaman worthy of the name ever refers to a ship as "it"; he will speak of "her," or "the old girl," or "the fighting lady." All ships are distinct personalities to the true sailor; they are homely or beautiful, awkward or graceful, hoydenish or well-mannered. To him, they possess sensibility and animation, and, because their behavior is frequently skittish and unpredictable, they are universally thought of as feminine.

This investiture with a soul of what was originally a stockpile of construction material is of the essence of the launching ceremony. When a ship slides down the building ways, she is not merely floated—she is *born*. As Longfellow says so well in his epic:*

> She starts, she moves, she seems to feel
> The thrill of life along her keel.

When her crew goes aboard, her nerves commence to function; when her machinery is started, her muscles flex; she has become a vibrant being.

A ship under attack by any agency acts exactly as does any other intelligent animal; she maneuvers to avoid being hit and she strikes back. It is an obvious corollary of these tactics that, on the one hand, she, as the objective of attack, should exploit to the fullest extent what knowledge she has of the attacker's weaknesses and strength, and, on the other, that the latter should do likewise in his attempt to land his blow. While it is true that this is a trite statement of a generality that is known to every military man, it is, nevertheless, equally true that its full significance in sea combat is seldom appreciated by any but experienced seamen. Until the advent of air attack upon shipping, this was not a matter of great concern, but the rapid rise of aircraft as a military weapon in the past few years has brought it into sharp relief. In so far as land-based air is concerned, it is a consideration of the utmost importance today. Failure to recognize its significance in the years prior to 1941 led directly to the exaggerated claims of the pre-war school of thought regarding high-altitude bombing of ships at sea. The same fallacy lay at the bottom of the incident off Luzon in the days immediately following Pearl Harbor, when destruction of a Japanese battleship by a suicide B-17 attack was widely and quite erroneously acclaimed. When the final record of the war is written, a vast number of similar exaggerations—made in good faith, undoubtedly, but based on inadequate knowledge of shipping attack—will be brought to light. The all-important lesson to be drawn from that record is that we should perceive the necessity for a thorough comprehension of the seamanship of naval warfare by *any* soldier, sailor, or marine who may be called upon to participate in sea action. In the United States, separated by an ocean's width from every other major power, this lesson is of vital significance.

In war, hostile shipping is *always* a prime strategic target. In intercontinental warfare, it is *the* prime strategic target; in conflict between adjacent powers occupying the same land mass, it may or may not be the top priority object of strategic attack, depending upon circumstances, but it will always be high on the list. It is imperative that there should be full recognition on the part of strategic air forces of this vital place of shipping in the war potential of any nation. Without that appreciation, no strategic air force can be adequately prepared to discharge an essential part of its basic mission. Assuming that such full recognition is present in the force, a thorough grasp of the combat capabilities and weaknesses of shipping under air attack presents itself as a required step in its training for war. It is with this point primarily in mind, that this brief article has been written.

Ships must float. To do so, they must possess positive buoyancy—and buoyancy is the product of watertight integrity. If a vessel's watertight integrity is impaired, she

* "The Building of the Ship."

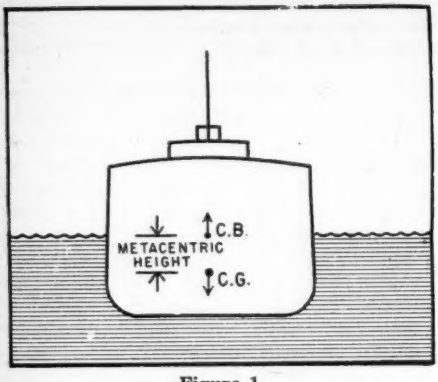


Figure 1.

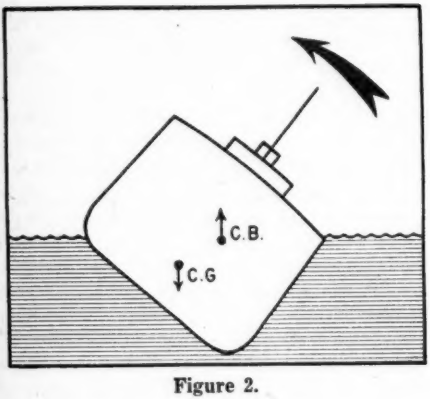


Figure 2.

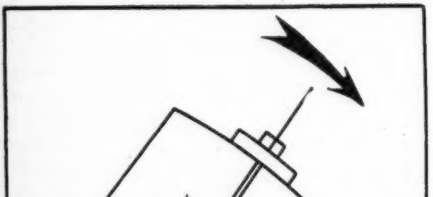


Figure 3.

loses buoyancy; if the damage is sufficiently extensive, she sinks. But that is by no means all the story. Buoyancy, alone, may be possessed by a dead ship—or a dead body; in addition, there must be stability to prevent capsizing. Stability in a floating mass is dependent upon what is known to the ship designer as "metacentric height." The metacentric height of any ship is a distinctive, but imaginary, factor, determined by the two opposing forces of her *weight* on the one hand, and her *buoyancy* on the other. Buoyancy may be represented most usefully as the resolution of all forces tending to float a ship, acting upward through one point called her "center of buoyancy." Similarly, weight, comprising all forces tending to sink a ship, may be resolved into one acting downward through her "center of gravity." With the ship resting absolutely quiet and motionless on calm water, these two forces are exactly equal, exactly opposite, and located in the same vertical plane. The slightest motion upsets this delicate balance. When this occurs, a rotating moment is set up; normally it opposes the disturbance and tends to restore the original equilibrium. It is then called a "righting" moment. If, however, due to any cause whatsoever, the moment is such as to continue the motion which disturbed the "even keel" condition, it is a "capsizing" moment; the ship is then unstable and will roll over. If this happens, since the upper structure cannot be made and maintained completely watertight, the vessel's buoyancy will be lost when it is submerged, and she will sink forthwith. A capsizing moment results from a negative metacentric height; the center of gravity (C.G.) is *above* the center of buoyancy (C.B.). It can be corrected only by reversing this relationship and establishing—or restoring—positive metacentric height.

In practical ship design and operation, satisfactory positive metacentric height is attained by so constructing and *loading* her that her C.G. will remain below her C.B. for all angles of list up to a critical limit which exceeds any expectable motion. Figures 1 and 2 show this simple but all-important re-

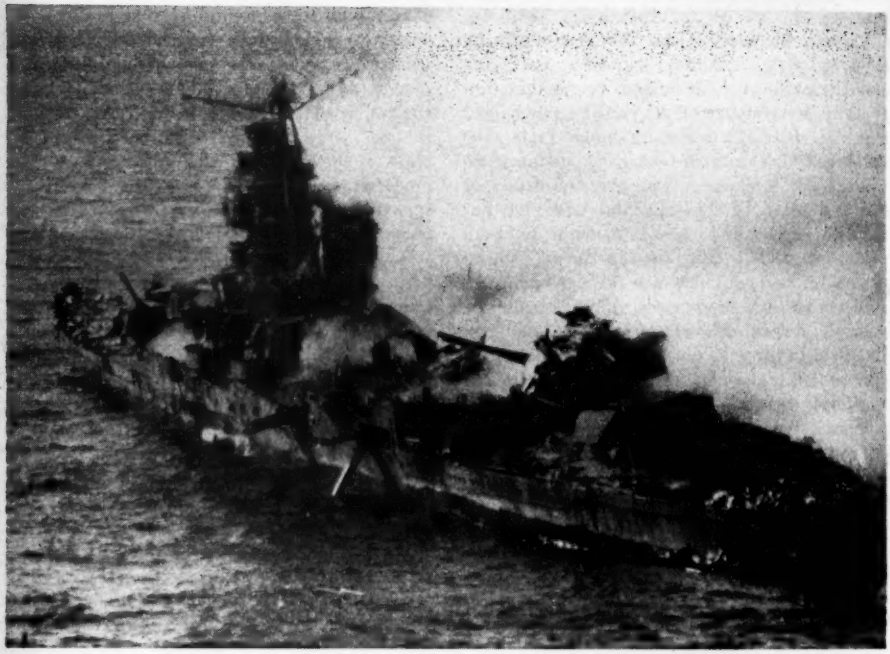
lationship. It is apparent from the figures that, if the positions of the C.G. and the C.B. are reversed, the inherent righting moment will disappear and a capsizing moment will take its place. A further important consequence of the metacentric height will be readily understandable from the sketches, viz., a large positive metacentric height will tend to reduce the amplitude of roll and pitch of the ship and will give her a "stiff" and jerky recovery, while a small value will tend to give her an "easy" motion of greater range. These are features of great concern in ship design. In men-of-war, for example, desirability of providing a good gun platform with efficient fire control dictates that the ship shall not be too "stiff" in a seaway; for merchant vessels, cargo space considerations and fear of shifting cargo when the ship is laboring, frequently influence against "easy" motion. These are but two of the major considerations affecting designed metacentric height, but they should serve to indicate the vital impact of the factor on the characteristics and behavior of any ship.

It is neither practicable nor necessary that naval and military men have specific knowledge of the designed metacentric height of every vessel which may come under their attack. Furthermore, the value changes with different loads carried in the vessel and, in merchant vessels particularly, with fuel consumed, etc. What is required is a basic understanding of the implications of shifting metacentric height in respect to stability and buoyancy—i.e., the stamina of any ship under stress and the effect upon her of different kinds of damage. To illustrate, assume that the vessels of Figures 1 and 2 has taken a torpedo hit and has suffered extensive flooding on one side, in as far as her center-line longitudinal strength bulkhead, as shown in Figure 3. The C.G. will move toward the damaged side as shown and the C.B. in the opposite direction, and a powerful capsizing moment will be set up.

One of the most effective and dreaded agencies of disturbing the metacentric balance and accelerating the loss of a damaged vessel is "free surface" flooding. This is a condition resulting from either the flooding of compartments having large horizontal area within the ship, or from the destruction of vertical bulkheads between two or more adjacent small compartments. The effect is similar to that experienced with any relatively flat, large surface container as, for instance, the familiar ice cube pans of a modern refrigerator. If the partitions separating the cubes in the pan are *not* placed in it when it is filled with water, difficulty will attend getting it back into the freezing unit without spilling. Those partitions are similar in function to the vertical bulkheads of a ship; when flooding occurs, if they are intact, they reduce "free surface" water action; if they are absent or have been damaged, as she rolls, the free water pours to the down side and increases the tendency to capsize. Dread of this "free water" danger influences modern warship compartmentation to as great a degree as does fear of loss of buoyancy.

Loss of buoyancy or stability, or both, are the greatest enemies of ship survival. Fires on board are a deadly menace also, but flames seldom account for complete loss by themselves; rather, they weaken resistance and open the gate to the great destroyer—water—and thus lead to eventual sinking. In the final analysis, it is nearly always with the ultimate purpose of keeping, or bringing, flooding under control, that a stricken ship's fight for life will be waged. As long as a vessel can float right side up she is alive, no matter how hopeless her situation may appear. The photograph of the Japanese heavy cruiser *Mogami*, taken at Midway and printed in this article, affords evidence of what a strong warship can survive; the *Mogami* was back in action against United States forces a few months after the photograph was taken. *No ship is ever destroyed until it has been sunk.* It is imperative that every military airman keep that fact constantly before him when operating over water.

When a ship under attack has taken a hit, the reduction in her fighting potential almost invariably goes far beyond the impairment of those functions which have received direct



The damaged Japanese heavy cruiser *Mogami*, off Midway.

damage. Before she was hit, she was free to devote every capability she had to unrestricted maneuver and maximum counterattack; after she has been damaged, however, this situation is altered in direct proportion to the seriousness of her hurt. Her main propulsion plant may be fully operative, yet sections of her hull and critical bulkheads may be so strained in the vicinity of her wounds that she does not dare to make high speed. Her steering gear may be intact and she, herself, fully controllable, yet compelled to run with the wind and sea—instead of heading into it—due to weakened structure forward. She may be listed to one side in such manner that her guns on that beam cannot be brought to bear on attacking ships or aircraft. Fires on board—an almost universal accompaniment of high explosive hits—may compel a certain course to prevent flame reaching explosive storage or other vital equipment or installations. Smoke from fires may render primary control stations untenable and thus force a change of heading. There are literally countless variations in the degree and location of damage, and in the external conditions attending it, which may act with compelling pressure upon the conduct of a ship after she has taken a blow. The efficiency of any attack upon her, regardless of whether it be the initial strike or a subsequent one, depends in large measure upon the ability of the attacker to recognize these and to forecast the resulting probable reaction of the ship. Only a seaman can do this with consistent accuracy, but any military airman can equip himself with grasp of the more important general principles which apply and thus prepare himself to exploit a measurable portion of the opportunities which present themselves and which, heretofore, have been unperceived so often.

In addition to the coercive impact of the effects of flooding, conflagration, and hull or bulkhead damage upon a vessel's handling, there are a host of other significant factors peculiar to ship versus aircraft combat. Familiarity with them is an invaluable addition to the "bag of tricks" in the cockpit of an attacking plane; but complete familiarity is not easily acquired. Here, once more, the only password to full knowledge is sound seamanship, for no understanding which has been learned by rote can encompass more than a fractional part of the wide field of circumstances which they cover. However, again as in the case of forecasting reaction to damage as a conditioner of subsequent ship tactics, any airman can possess himself of certain simple facts which are preeminent. One of these is that most ships will, normally, stand up to hull damage forward much better than they will to like damage aft. This is due to the fact that the large and highly vulnerable boiler and machinery spaces are aft and the exposed shafting, screws and vital rudder are in the stern. In general terms, a torpedo hit, or a near miss by a heavy bomb, along the after half of a vessel's hull will cripple her far more than if it is in the forward portion. A direct hit by a heavy armor-piercing bomb in the same area will pay somewhat the same disproportionate dividens, although there are more exceptions to this rule than to that for torpedoes and near misses. With light case bombs, this advantage of hits aft largely disappears; where carriers are the targets, it is definitely in favor of a hit forward (other things being equal) because of the extreme inflammability of the ships and practically everything in them.

It is pertinent to emphasize, here, the fact that any strategic air force should be well trained in torpedo attack and well equipped to use it, for the torpedo is still the most deadly missile in sea warfare. In World War II, torpedoes from submarines, surface ships and aircraft sank approximately 75 percent of all the ocean shipping sent to the bottom. There is no reason to expect that the advent of atomic explosives will alter this ratio in future war, for they can be employed as readily in torpedoes as in any other form, and the underwater body of a ship always has been, and always will be, her most tender part. Skip bombing, while it is effective against poorly armed vessels, is not likely to be profitable where warships or heavily armed merchantmen are the targets. Against these latter, it is akin to *kamikaze* attack. Aerial torpedo attack, on the contrary, can be brought in effectively and gotten out again if it is properly coordinated with covering attacks by other means. The recent war has not changed the status of the torpedo as a proved and major aerial weapon in sea warfare.

Closely associated with the subject of aerial attack upon ships, is what is called in naval operations "scouting." Scouting is a generic term embracing the activities of search, making contact and amplifying reports, and "tracking" or "trailing" enemy forces after they have been located. It is far too broad a subject to be discussed in a paper such as this, but there is one point of transcendent importance which should be brought out, since it bears so directly on what has been said above. This is the fact, repeatedly demonstrated in peacetime games of the '30s and in the four years of war just ended, that airmen who are not seamen by profession are generally lacking in appreciation of the fundamental necessity in sea operations for *immediate* and *accurate* contact reports, for insuring, thereafter, that touch is not lost with the enemy, and that, while the contact is being held, a continuous flow of information is maintained to the home base or headquarters. Consequences of failure to conform to this pattern have been disastrous, almost without exception. The *causes* of such failures are usually rooted in a lack of fundamental seamanship on the part of the air personnel involved. Ships are highly mobile and the ocean is very large; once sighted, a vessel *must be kept* under surveillance. More often than not, the mistaken courage and enthusiasm which lead to immediate attack by a search plane before reporting his contact, prove extremely costly. The plane is frequent-

ly shot down in the action and no report whatever gets through. If the plane commander has made a report before he attacks and he does get shot down in his strike, not only can inaccuracies in the early report not be corrected; but far worse, contact is lost and may never be regained. Attack too early —even approach too close—may warn the quarry that she has been located and thus induce possibly successful evasive action or withdrawal by a valuable prize. The all-important principle which is lost sight of in such cases, is that a ship or force at sea can seldom be seriously hurt by air attack unless it is made in strength. Single attacking aircraft are frequently thrown away uselessly; if the plane lost happens to be the only one in contact at the time, the best—possibly the only—means of bringing *effective* attack home has evaporated. Although this principle is obvious and is basic in the training and briefing for all sea search missions, when contact is made the academic veneer of seamanship hastily acquired falls away in the excitement and the primary mission is aborted.

It would take volumes to touch adequately on all the ramifications of the twin subjects of ship damage and air attack at sea. The preceding discussion makes no pretense of even attempting the task; it is merely a mention of a few of the highlights. To anyone who gives serious thought to the problems which present themselves in this dual field, there must occur the final conviction that *any strategic air force must employ seamen in the cockpits of its aircraft in exactly the same proportion as its operations are concerned with shipping.*

Should an alumnus of our college advocate that the signals of the football team be sent to the rival teams prior to the games against them, he would be regarded as a more or less harmless lunatic. And should one of our wealthy relatives begin to scatter sunshine and good will by giving away his possessions indiscriminately, to those who have no claims on them, he would be regarded as a psychiatric case, and the courts would be petitioned to take action to restrain his profligacies. And if the municipal authorities of our home town decided to make friends of the gangsters by issuing arms, bombs, and other lethal weapons to them, we would consider those officials crazy, if not worse.

Yet an otherwise seemingly normal man can advocate that we give away our war secrets, which have been developed by research and development work costing billions of dollars, and still retain the status of a reputable American citizen.

Naturally the engineers, scientists, and technicians of other nations may engage in research and development work which, in course of time, will bring them on a par with our present status re the developments of the atomic bomb, radar, the radio proximity fuze, et cetera. We trust that when they have done so we will have made such further progress that their products will be obsolescent; in no field of science have the gates on the roads to more advanced fields been closed.

—Quoted from *The Military Engineer*

Surrender on the Air

An Official Signal Corps History of Message Traffic on the Japanese Capitulation.

IN the closing hours of the Japanese war, General Headquarters, United States Army Forces, Pacific, in Manila, became the main stage of a historic radio drama bringing to an end the blood bath that had drenched the world for six years.

The Japanese government had accepted the surrender terms with a provision that the Emperor remain on the throne, the United Nations had conceded with a provision of their own, that he be subject to the orders of the Allied Supreme Commander, and the world waited. Meanwhile, the war was continuing. Bombs were falling, guns were firing, people were dying.

In the teletype conference room in the battered City Hall of Manila, several GHQ officers were gathered at a table, reading a routine message from the War Department at Washington. It was nearly 0900, Manila time, of the morning of 15 August 1945.

Suddenly, in the midst of the teletype conference, came the extraordinary order from the War Conference Room, Washington: "STAND BY FOR IMPORTANT MESSAGE."

Then came the message that affected the destinies of millions of the world's population. The complete message read:

IN THE CLEAR

From: General Marshall
To: General MacArthur
Info: Nimitz Deane and Wedemeyer
NR: 1408

With reference to paragraph 2 of WARX 49182, you are hereby officially notified of Japanese capitulation. Your directive as Supreme Commander for the Allied Powers is effective with the receipt of this message.

Marshall

The telecon channel was not the customary one for messages to MacArthur. Evidently, an alert Signal Center Officer in Washington had found it open and shoved the message through on it. A few minutes later the same message came over the regular San Francisco-Manila channel after relay from Washington.

Receipt of an important message uncryptographed from the War Department broke a long precedent. But it was shortly followed by a request from station WAR for an officer qualified to accept a top secret urgent message in the usual cryptographed form. Then came the detailed instructions.

At approximately 1100 hours, the following message was transmitted to Japan:

IN THE CLEAR
OPNL PRIORITY

15 August 1945

From: Supreme Commander for the Allied Powers
To: The Japanese Emperor, the Japanese Imperial Government, the Japanese Imperial Headquarters
NR: Z-500

I have been designated as the Supreme Commander for the Allied Powers (the United States, the Republic of China, the United Kingdom and the Union of Soviet Socialist Republics) and empowered to arrange directly with the Japanese authorities for the cessation of hostilities at the earliest practicable date. It is desired that a radio station in the Tokyo area be officially designated for continuous use in handling radio communications between this headquarters and your headquarters. Your reply to this message should give the call signs, frequencies and station designation. It is desired that the radio communication with my headquarters in Manila be handled in English text. Pending designation by you of a station in the Tokyo area for use as above indicated, station JUM on frequency 13705 kilocycles will be used for this purpose and WTA will reply on 15965 day and 7090 night. Upon receipt of this message, acknowledge.

MacArthur

Naturally, there had been no radio intercourse with the Japanese since 1942. Efforts

to establish contact with JUM, which had handled commercial traffic with the United States before the war, were made but this proved to be a large order. Meanwhile, the war was continuing.

The transmitters were immediately tuned to JUM's receiving frequency, 15,965 kilocycles, and our receivers zeroed to its transmitting frequency, 13,705 kilocycles.

Then, our preamble (call signs, etc., preceding the text of the message) was sent in English, in Kana and in Romaji, the two adaptations of the Japanese language to Morse code: "JUM FROM WTA (Manila). WE HAVE AN URGENT MESSAGE FOR YOU." JUM did not reply.

Efforts were made to contact other Tokyo stations, any Tokyo station. We could hear the Japanese broadcasting and receiving on many circuits. As fast as our receivers picked them up, our transmitter would adjust our frequencies to theirs and an effort was made to try to break in with our important message, but no Japanese station would acknowledge us.

Tokyo was talking to Geneva. We came in

"TOKYO FROM MANILA. WE HAVE AN URGENT MESSAGE FOR YOU."—No reply. Tokyo was talking to Singapore—"TOKYO FROM MANILA. WE HAVE AN URGENT MESSAGE FOR YOU."

Tokyo was talking to Stockholm, Saigon, many other places. Always the Japs played deaf, although we knew our transmitters were blanketing their other receptions because we could hear them exchanging readability signals as a result of our interference.

We were getting nowhere, and the war was continuing. The Chief Signal Officer then arranged for a battleship in Manila Bay to broadcast a message to JUM on the international distress frequency, 500 cycles, requesting they contact WTA on 15,965 kilocycles. He also had the Army Airways Communications Service send the same message on our meteorological frequency, which the Japs were known to listen to assiduously.

At 1600, still without an acknowledgment, General MacArthur's message was sent to the office of the Chief Signal Officer, Washington, with a request that all possible facilities be employed in trying to have it acknowledged by Japan.

The first message had not been cleared when General MacArthur's second message was received at the Signal Center at 1403. Aimed at the immediate ending of hostilities, it was even more important than the first. It read as follows:

IN THE CLEAR
URGENT

15 August 1945

From: Supreme Commander for the Allied Powers

To: The Japanese Emperor, the Japanese Imperial Government, the Japanese Imperial Headquarters

NR: Z-501

Pursuant to the acceptance of the terms of surrender of the Allied Powers by the Emperor of Japan, the Japanese government and the Japanese Imperial Headquarters, the Supreme Commander for the Allied Powers hereby directs the immediate cessation of hostilities by Japanese forces. The Supreme Commander for the Allied Powers is to be notified at once of the effective date and hour of such cessation of hostilities, whereupon Allied forces will be directed to cease hostilities.

The Supreme Commander of the Allied Powers further directs the Japanese Imperial Government to send to his headquarters at Manila, Philippine Islands, a competent representative empowered to receive in the name of the Emperor of Japan, the Japanese Imperial Government and the Japanese Imperial General Headquarters certain requirements for carrying into effect the terms of surrender. The above representative will present to the Supreme Commander for the Allied Powers upon his arrival a document authenticated by the Emperor of Japan, empowering him to receive the requirements of the Supreme Commander for the Allied Powers.

The representative will be accompanied by competent advisers representing the Japanese army, the Japanese navy and the Japanese air forces. The latter adviser will be thoroughly familiar with airdrome facilities in the Tokyo area.

Procedure for transport of the above party under safe conduct is prescribed as follows:

Party will travel in a Japanese airplane to an airdrome on the island of Ie Shima, from which point they will be transported to Manila, Philippine Islands, in a United States airplane. They will be returned to Japan in the same manner. Party will employ an unarmed airplane, type Zero model 22, L2, D3. Such airplane will be painted all white and will bear upon the sides of the fuselage and top and bottom of each wing green crosses easily recognizable at 500 yards. The airplane will be capable of inflight voice communications, in English, on a frequency of 6970 kilocycles. Airplane will proceed to an airdrome on the island of Ie Shima, identified by two white crosses prominently displayed in the center of the runway. The exact date and hour this airplane will depart from Sata Misake, on the southern tip of Kyushu, the route and altitude of flight and estimated time of arrival in Ie Shima, will be broadcast six hours in advance, in English, from Tokyo on a frequency of 16125 kilocycles. Acknowledgment by radio from this headquarters of the receipt of such broadcast is required prior to take-off of the airplane. Weather permitting, the airplane will depart from Sata Misake between the hours of 0800 and 1100 Tokyo time on the 17th day of August 1945. In communications regarding this flight, the code designation "Bataan" will be employed.

The airplane will approach Ie Shima on a course of 180 degrees and circle landing field at 1000 feet or below the cloud layer until joined by an escort of United States army P-38's which will lead it to a landing. Such escort may join the airplane prior to arrival at Ie Shima.

MacArthur

Tensely, tirelessly, operators kept trying to make Tokyo listen, not just in Manila, but all over the world.

In his efforts to stop the fighting, General MacArthur ordered the officer in charge of the Tokyo circuit to send his second message first.

Transmission of the second message to Washington for rebroadcast by all other available facilities crossed with Washington's report on their efforts with the first message.

The hours ticked on and the guns and bombs blasted on, and the blood of human beings pulsed into the earth in many places while man's most powerful agencies of communications the whole world over tried vainly to make one city respond.

Three times we had sent our message out blind (without receipt), but in Signal Corps procedure a blind message is little better than no message transmitted.

Sweat drenched the shirts of the men laboring in the radio operations room of the Signal Center in oven-hot Manila. They had been at the keys or with the earphones clamped on their heads for ten futile hours. A frantic undercurrent gripped everyone present. There was no drama of the obvious sort, but each man knew that lives were being blotted out for lack of an acknowledgment to the message they were trying to get through. Quietly, they talked about it, cursing.

Each time a Tokyo station came in on the receiver, someone phoned the transmitter station to adjust its frequency to that station, and the key began pounding its unheeded monotone.

Now it was Tokyo talking to Taihoku. Our transmitters were tuned to the proper frequency.

TOKYO FROM MANILA. WE HAVE AN URGENT MESSAGE FOR YOU.

In Romaji, in Kana, in——

But the Tokyo station acknowledged the Kana preamble.

With painful restraint, slowly, so that the Japanese operator would not miss it, our operator began sending MacArthur's second message.

The text was in English. When it was half transmitted, the Jap broke in with a flood of Japanese questions. Evidently, he had been trying to receive it in Japanese. Then he began sending us cryptographed Japanese traffic. It was incredible, but he apparently thought we were a Japanese station—in Manila!

We were forced to go back to monitoring JUM and the other Japanese circuits, while the war was continuing.

All around the world, powerful radio stations were doing the same thing, minute after minute, calling Tokyo, calling Tokyo, calling Tokyo. One of them was KER, commercial station in San Francisco.

In bland disregard of the electronic commotion, JUM was sending financial messages to Handelsbank, Stockholm.

Suddenly, the operator in the Signal Center held up his hand for attention and began to type:

KER DE JUM ZOK GA 40/SWO ZHC? 2105JIT

The Japanese Station, using commercial radio procedure, was saying:

KER FROM JUM. OK. GO AHEAD. SEND 40 WORDS PER MINUTE, ONCE. HOW ARE (receiving) CONDITIONS? 2105 HOURS JAPANESE IMPERIAL TIME.

KER replied but, tuned to JUM's transmitting frequency, we did not hear it. Then, from JUM:

KER DE JUM HR UNABLE START JUJ (evidently meaning "we are unable to start JUJ," another Japanese Station) PSE (please) REMAIN JUM TKS (thanks) AR (end of transmission) 2109 JIT (Japanese Imperial Time).

The next interception was:

KER DE JUM ZSF FIVE.

The Jap operator was boasting. He was telling KER, in commercial radio language, to send five words a minute faster.

After that came:

KER DE JUM HR NW XQ SF BT (here now service message to San Francisco, break.) WE WILL ZOA (start up) JNU3 (another Tokyo circuit, 13,475 kilocycles) IN FEW MINS (minutes) FOR YOU CMF STP (Confirm, Stop.) YR MSG BQ NR 76500 RVD OK BT (your message with text 76500 received OK. Break.) TOK AR (Tokyo. End of Transmission.) 2140JIT.

That meant that Tokyo had received a message from an American station. But, was this acknowledged message, number 76500, a MacArthur message? We called USF, San Francisco Army Station, on a voice circuit, and asked the Duty Officer to phone KER and learn whether 76500 was the all-important second message of General MacArthur, or either one of his messages. In three minutes, he phoned back across the Pacific—it was the first MacArthur message!

Over local phones the word went out—Tokyo had acknowledged!

JUM was very busy sending regular commercial messages to San Francisco, resuming its traffic suspended three and a half years ago, just as though there never had been a war! We tried in vain to break in.

Now JUM was receiving from Singapore.

The Singapore operator sends the "wait" signal, indicating a pause in his transmission. It is shortly after 2300. Our transmitter is tuned to JUM.

JUM FROM WTA (Manila). WE HAVE AN URGENT MESSAGE FOR YOU.

JUM sends a signal to Singapore to stand by. He has heard us!

He returns our call.

Then messages pour into the Signal Center from military radio installations all around the Manila area, alerting WTA to the fact that JUM is calling. Stations everywhere had been listening in on the greatest radio drama ever staged and they all wanted to make sure WTA didn't miss its cue.

From Manila went this service:

JUM DE WTA (Tokyo from Manila) HR URG MSG HW (Here is an urgent message. How about it?)

JUM serviced back a request that WTA transmit to JNP, Tokyo.

The service was repeated to JNP, and JNP replied:

GA (Go ahead.)

MacArthur's second message followed. Re-

ceipt for it came at 2333 hours. It was followed by this message:

JNP de WTA. You will stand by and monitor WTA on 15965 Kc continuously. Continue to transmit on JNP until further notice in answer to our messages. Establish monitoring on your transmitting frequency and advise this headquarters at once of any unauthorized or unofficial transmission.

MacArthur

Then WTA sent MacArthur's first message, and gained a receipt at 0025 of 16 August, although the radio channel, meanwhile, had been transferred to Station JNU3, on 13,475 kilocycles, evidently in the same room in Tokyo, because JNP had begun to fade at about 2330 hours.

A comic ante-climax came when JNU3, a commercial station, with a hint of apprehension over a possible loss of revenue, inquired:

ARE YOU GOING TO SEND PRIVATE MESSAGES?

When the American Signal Officers finally figured out that the Jap was worried about commercial traffic, they decided not to answer.

Then JNP, another Japanese station, came in to inquire:

DO YOU WANT AN ANSWER TO YOUR MESSAGE?

"Hell, yes!" roared the officer-in-charge when shown the query.

The operator smiled and turned to his key. JNP FROM WTA, he telegraphed—YES.

With the circuit established, an interchange of highly significant messages began which culminated in the surrender of Japan. They are reproduced here in their proper order:

IN THE CLEAR
ROUTINE

16 August 1945

To: General of the Army MacArthur, Supreme Commander for the Allied Powers

From: The Japanese Government

NR: None

Communication dated August 16th from the Japanese government and Imperial Japanese Headquarters to General of the Army MacArthur Supreme Commander for the Allied Powers. We are in receipt of the message of the United States government transmitted to us through the Swiss government and of a message from General MacArthur received by the Tokyo radiograph office, and desire to make the following communication.

1. His Majesty the Emperor issued an imperial order at 1600 o'clock on August 16th to the entire armed forces to cease hostilities immediately.

2. It is presumed that the said imperial order will reach the front lines and produce full effect after the following lapse of time:

A. In Japan, proper, 48 hours.

B. In China, Manchuria, Korea, Southern regions except Bougainville, New Guinea, the Philippines 6 days.

C. In Bougainville 8 days.

D. In New Guinea and the Philippines, in case of various local headquarters 12 days but whether and when the order will be received by the 1st line it is difficult to foresee.

3. With a view to making the august wish of His Majesty regarding the termination of the war and the above mentioned imperial order thoroughly known to all concerned, members of the Imperial Family will be dispatched as personal representatives of His Majesty to the headquarters of the Kwantung army, expeditionary forces in China and forces southern regions respectively. The itinerary, type of aircraft, markings, etc., will be communicated later. It is accordingly requested that safe conduct for the above be granted.

4. As regards the request to dispatch a competent representative accompanied by service advisers to the headquarters of General MacArthur in Manila leaving Sata Misaki in Kyushu on August 17th, we feel greatly embarrassed as it is impossible for us to arrange for the flight of our representative on August 17th due to the scarcity of time allowed us. We will, however, proceed at once with necessary preparations and notify General MacArthur as to the date of the flight of such a representative which will take place as soon as possible.

5. It is proposed to make the communica-

tions with the Supreme Command of the Allied Powers in the following manner:

A. Sender and receiver on the Japanese side—the general headquarters or the government.

B. Radio stations on the Japanese side—Tokyo station call sign JNP frequency 13740 kilocycles.

C. Means of communications—radiograph.

D. Language—English.

6. We fail to understand the type of airplane described in the communication received from General MacArthur. We request, therefore, that the message be repeated bearing upon type fully and clearly.

7. In order to make sure that we have received without fail all the communications sent by General MacArthur, we beg him to repeat once again through the route of communication specified under heading 5 of the present communication.

No Sig

Time of receipt: 162330I

IN THE CLEAR
ROUTINE

16 August 1945

From: The Japanese General Headquarters
To: Headquarters of General MacArthur
NR: 2

Regarding item 3 of our first radiogram:

Itinerary expected to leave Tokyo at 9 o'clock on August 17th "the party (3) for the south is due to leave on 18th" by way of the following route the itinerary is subject to some alterations owing to weather and other conditions

1. Bound for Manchuria (Tokyo-Yonago-Seoul)

2. Bound for China (Tokyo-Fukuoka-Shanghai-Nanking)

3. Bound for the south (Tokyo-Fukuoka-Shanghai ((staying one night))-Canton-Tourane-Saigon)

Type and markings of airplanes

1. Planes for Manchuria and China are low-winged monoplane twin-engined middle-sized transport of Mitsubishi MC20-2 type

2. Plane for the south is middle-winged monoplane twin-engined middle-sized bomber with the cigar shaped fuselage resembling that of B26

3. Markings are sun flag with red streamer of 4 meters length

Time of receipt: 17005O

IN THE CLEAR
URGENT

17 August 1945

From: Supreme Commander for the Allied Powers
To: Japanese General Headquarters
NR: Z-502

Your messages of August 16th numbers 1 and 2 have been received and are satisfactory. Every possible precaution will be taken to insure the safety of the planes bearing the Japanese representatives on their missions. My two messages will be repeated as requested. Notify this headquarters as soon as possible of the proposed date of flight of the Japanese representatives to Manila. Type of plane desired is Douglas DC-3 type transport understood to be your navy type Zero model 22, L2, D3 or your army type 100 transport plane K1 57. If necessary you are authorized to change the type of plane bearing your Manila representatives, giving description thereof.

MacArthur

Time of origin: 170341I

IN THE CLEAR

17 August 1945

From: The Japanese GHQ
To: The Allied Supreme Commander
NR: 3

At about noon August 16 a group of some 12 Allied transport approached extremely near the coast of Kochi Shikoku at that time the imperial order to cease hostilities had not yet been issued and our air units ventured to attack the Allied vessels apparently causing some damage.

At 4 PM the order was issued to cease hostilities as stated in our radiogram No. 1.

It takes some time for the said order to reach the front line and produce full effect.

It is earnestly requested that the Allied forces will refrain from approaching the home

waters of Japan proper until the order will have been fully effectuated.
Time of receipt: 171019I

IN THE CLEAR

17 August 1945

From: The Japanese GHQ
To: The Supreme Allied Commander
NR: 4

1. It is stated in the message of the President of USA transmitted on August 16 through the Swiss government "send emissaries at once to the Supreme Commander for the Allied Powers, and fully empowered to make any arrangements directed by the Supreme Commander for the Allied Powers to enable him and his accompanying forces to arrive at the place designated by him to receive the formal surrender." According to this message the task of the "emissaries" is to be understood to make necessary arrangements for the reception by the Supreme Commander and his accompanying forces of the formal surrender.

2. However in the "urgent" message sent by the Supreme Commander to the Japanese emperor the Japanese government the Japanese General Headquarters which was received by the Tokyo radiograph office and to which reference was made in our first radiogram it is stated that the Supreme Commander of the Allied Powers further directs the Japanese Imperial Government to send to his headquarters in Manila a competent representative empowered to receive in the name of the Emperor of Japan the Japanese Imperial Government and the Japanese Imperial General Headquarters certain requirements for carrying into effect the terms of surrender. According to this message it appears that the task of the Japanese representative is to receive "certain requirements for carrying into effect the terms of surrender."

3. We should like to clarify the following points because the forms and contents of the "full powers" to be issued will be different depending upon your answer.

A. Can we proceed according to the understanding stated in the said item 1 assuming that the Supreme Commander's message has the same meaning with the President's message in this respect?

B. If not please explain exactly what is meant by the "certain requirements for carrying into effect the terms of surrender." In any way we assume that the signing of surrender terms is not among the tasks of the Japanese representative in question.
Time of receipt: 171010I

IN THE CLEAR
URGENT

From: Supreme Commander for the Allied Powers
To: The Japanese General Headquarters
NR: Z-504

Reference your radiogram number 4 of August 16th. Your assumption that the signing of surrender terms is not among the tasks of the Japanese representative to Manila is correct. The directive from this headquarters is clear and explicit and is to be complied with without further delay.

MacArthur

Time of origin: 171241I

IN THE CLEAR
URGENT

17 August 1945

From: The Japanese GHQ
To: The Allied Supreme Commander
NR: 5

While on our side the imperial order has already been given to cease hostilities, the Soviet forces are still positively carrying on the offensive and their spearhead is reaching near a point west to Mukden early this morning. As the result, the Japanese forces in Manchukuo are meeting great difficulties in carrying out the imperial order. It is urgently requested that the Supreme Commander would take proper steps to bring about immediate cessation of the Soviet offensive.
Time of receipt: 171505I

IN THE CLEAR

17 August 1945

From: The Japanese Government
To: The Allied Supreme Commander

NR: 6

Please correct the sender of our radiogram number 4 from "Japanese GHQ" to the "Japanese government."

Time of receipt: 171527I

IN THE CLEAR

17 August 1945

From: The Japanese GHQ

To: The Supreme Allied Commander

NR: 7

Our representative to Manila selected. Due to necessary internal procedures he is scheduled to leave Tokyo on August 19. Further details will follow.

Time of receipt: 171640I

IN THE CLEAR
URGENT

17 August 1945

From: The Japanese General Headquarters

To: The Headquarters of General MacArthur

NR: 7

Re our radiogram number 2,

1. The parties for China and Manchuria left Tokyo today at 9:30 A.M.

2. The party for the south, reported in our previous message to leave on the 18th, left Tokyo also today at 9:30 A.M. in order to avoid possible delay due to bad weather.

3. The type and markings of the planes and their routes are as communicated before.

Time of receipt: 171705I

IN THE CLEAR

18 August 1945

From: The Japanese GHQ

To: The Supreme Commander for the Allied Forces

NR: 8

Regarding the advance notice of flight schedule of our representatives to Manila, will broadcast at 2000 August 18, using however the frequency of 16145 kilocycles instead of that of 16124 which you designated by your first message of August 16.

Time of receipt: 181730I

IN THE CLEAR

18 August 1945

From: The Japanese GHQ

To: The Supreme Commander for the Allied Powers

NR: 9

Schedule of our planes movement regarding our representative flight to Manila, the party will employ two unarmed twin-engined single winged land attack planes of the type 1 (ITI Shiki Rikujo Kogekiki) with markings as designated by you. Weather permitting, the planes will leave Kisarazu airdrome on the 19th at 0700, pass over Sata Misaki on the southern tip of Kyushu at about 1100 and then proceed via Nakanoshima, Takarajima, Torijima and a point 35 nautical miles north of Ie Shima, reaching Ie Shima at about 1320 on the same day. During the flight over these points, they will take an altitude of 6000 to 9000 feet. In approaching Ie Shima, the planes will as you designated take the course of 180 degrees and circle landing field at an altitude of 1000 feet or below the cloud layer until joined by your escort.

Communication contact your planes call signs are JBACY and JBACZ and as you designated we desire to contact your airdrome by radio with the frequency of 8915 Kcs, besides carrying on in flight voice communication with the frequency of 6970 Kcs. Please notify us of the station designation, call sign and frequency of your station at Ie Shima.

Time of receipt: 181905I

IN THE CLEAR
URGENT

18 August 1945

From: The Supreme Commander for the Allied Powers

To: The Japanese Imperial General Headquarters

NR: Z-509

In reply to your message number 9 dated 18 August 1945 aircraft control tower at Ie Shima is designated MOCA repeat MOCA and will guard 6970 kilocycles for voice com-

munications. The air communications center will guard 8915 kilocycles with voice call PINBALL repeat PINBALL and RP 7 repeat RP 7 for voice or code transmissions. Desire your two airplanes use call signs Bataan 1 and Bataan 2 as designated in my radio of 15 August.

MacArthur

Time of origin: 182317I

IN THE CLEAR

19 August 1945

From: Japanese GHQ

To: The Supreme Commander for Allied Powers

NR: 10

The planes carrying the party of representatives have left Kisarazu airdrome on 0718 August 19.

Time of receipt: 191010I

Each of these messages was transmitted by the fastest possible means without regard to normal routine procedures. United States Army Signal Corps teamwork around the world had repaired in ten hours and forty minutes a communications link between the United States and Japan which had been broken for almost four years of warfare.

Wars are fought today not solely by ground, naval and air forces but by all citizens united in a joint effort which touches every phase of national and private life. The danger zone of modern war is not restricted to battle lines and adjacent areas but extends to the innermost parts of a nation. No one is immune from the ravages of war.

With present equipment, an enemy air power can, without warning, pass over formerly visualized barriers or "lines of defense" and can deliver devastating blows at our population centers and our industrial, economic or governmental heart even before surface forces can be deployed. Our own Air Force, when mobilized and deployed, would have a similar capability and might attack an enemy within hours instead of days, weeks, or months required by our surface forces.

Future attack upon the United States may well be without warning, except what may be obtained from an active national intelligence agency.

In any future war the Air Force, being unique among the services in its ability to reach any possible enemy without long delay, will undoubtedly be the first to engage the enemy and, if this is done early enough, it may remove the necessity for extended surface conflict.

Air superiority accordingly is the first essential for effective offense as well as defense. A modern, autonomous, and thoroughly trained Air Force in being at all times will not alone be sufficient, but without it there can be no national security.

—General of the Army Henry H. Arnold

Vitally important in the strategic defense of the United States is Brazil which offers the nearest point of approach to this continent from the east. It is also vital to the security of the Panama Canal that the various avenues of approach through Brazilian territory be in friendly hands and adequately guarded. The traditional friendship between Brazil and the United States and complete agreement between the two peoples on matters of interest to the Western Hemisphere have had an important bearing on our defense preparations. Close cooperation between the United States and Brazil was crystallized through the formation of a Joint Brazil-United States Defense Commission in May 1942. This Commission has since been working on mutual defense plans and matters related to our common war effort.

—General of the Army George C. Marshall

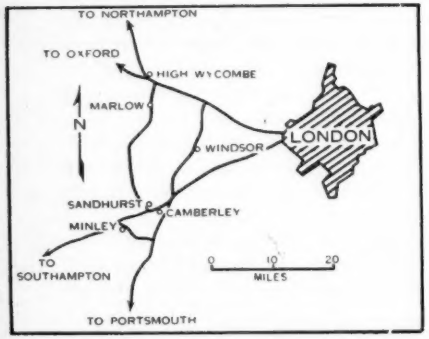
The British Staff College

LIEUTENANT COLONEL KENNETH C. DOWNING, *Infantry*
United States Army Training Liaison Officer attached to the British Staff College

IT is the wish of the author that this article may give the United States Army officer, particularly the staff officer, a general knowledge of the organization, methods of instruction, and history of the British Staff College, which holds the same place in the British Army that Leavenworth holds in the American Army for the staff officer.

Location

The Staff College is located at Camberley, Surrey, England approximately thirty miles southwest of London on the London-Southampton road. It is screened from view, from the highway, by a strip of beech grove and surrounded by beech, rowan, chestnut and alder, so that unless one knew of its location it would be passed by unnoticed.



Organization

The College is organized with a headquarters and two wings, each working on a separate course as follows:

a. The Camberley Course at Camberley and Minley, which trains officers for second grade staff appointments anywhere in the Army.

b. The Sandhurst Course at Sandhurst, which trains officers for second grade staff appointments at headquarters other than those of field forces. (Second grade staff appointments correspond to assistant staff officers in the United States Army).

The Commandant of the Staff College is responsible for the general direction of both wings, each of which is commanded by an Assistant Commandant who is responsible for the detailed direction of his particular wing.

At each wing is an establishment of Directing Staff (DS), instructors, who function under their respective Assistant Commandant.

The Camberley Wing is divided into three Divisions, two at Camberley and one at Minley, each under a General Staff Officer, Grade 1 (GSO 1), who corresponds to the chief of a general staff section in the United States Army.

The Sandhurst Wing is divided into two Divisions, each under a GSO 1.

Each Division is in turn subdivided into a number of tutorial syndicates, each composed of ten student officers of all branches, and in charge of a member of the Directing Staff.

Method of Instruction

The principal method of instruction is by use of syndicate or divisional discussions, either alone or combined with control demonstrations; however, central lectures are given when introducing general subjects.

Syndicates are of two types, the tutorial syndicate mentioned above, and the exercise syndicate in which a tutorial syndicate, or in the larger exercises sometimes a number of tutorial syndicates, are formed into a special syndicate for a particular exercise.

In the tutorial syndicate discussions, précis are issued on various subjects, and in the majority of cases a questionnaire is included, which is to be studied beforehand and then discussed by the syndicate. The DS will often appoint one of the syndicate

Central demonstration in Rawlinson Hall.

to act as chairman who is responsible for conducting the discussion and for calling upon any member of the syndicate to give his views on the questions or on any point in the précis. The chairman is also responsible for summing up after the discussion of each question and for bringing out any points not covered in the discussion. The DS does not normally intervene during the discussion unless it is becoming irrelevent or unless some important point has been missed.

The member of the directing staff (DS) charged with the preparation of a subject or exercise, in addition to preparing the précis and necessary accompanying material, such as maps, also briefs or orients the remaining DS to insure that uniform instruction is obtained by all syndicates.

The syndicate method of instruction was introduced in 1922 by Field Marshal (then Major General) Sir W. Edmund Ironside, K.C.B., C.M.G., D.S.O.

History

In 1799, Major General (then Colonel) Gaspard Le Marchant, one of the first Channel Islanders to enter the British Army, was responsible for a proposal to form a military college to consist of four departments as follows:

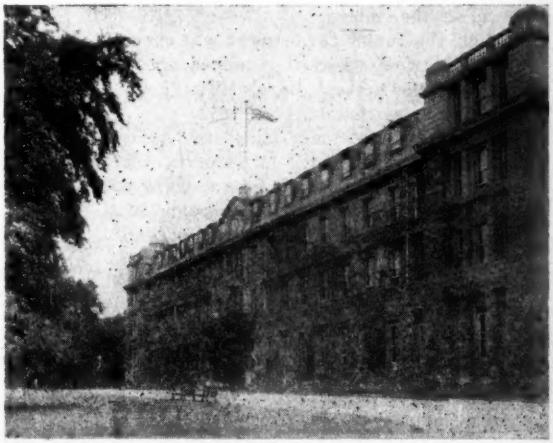
The First Department, to be a school for the general instruction of boys from 13 to 15, who would not necessarily enter the Army.

The Second Department, to be for cadets who had made satisfactory progress in the First Department and who wished to obtain commissions.

The Legion, a school for noncommissioned officers and for sons of soldiers, of 13 to 15 years of age, who should by the superior education received, provide a source for noncommissioned officers.

The Third Department, a college for the improvement of officers of over four years of service, to fit them for staff employment.

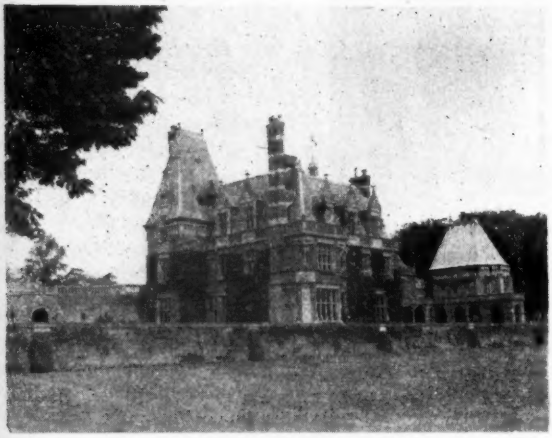
Of these four departments only two were actually formed, the Second, for cadets who wished to obtain commissions, and the Third, for training of officers for staff employment. The Third Department was established



The Staff College, Camberley.

at High Wycombe in the same year with Colonel Le Marchant as commandant.

In 1801 and 1802 royal warrants were published approving the establishment of a Royal Military College to be divided into Senior and Junior Departments corresponding to the original proposed Second and Third Departments. Colonel Le Marchant was appointed Lieutenant Governor and Supervisor General of the college.



Minley Manor.

In 1802 the Junior Department was opened at Great Marlow, where it remained until it moved into the present Royal Military College buildings at Sandhurst in 1812.

The Senior Department joined the Junior Department at Sandhurst in 1820. In 1857 it was renamed the Staff College, and moved into the College building at Camberley in 1862, where it has remained to the present date.

Shortly after war was declared in 1939, one division of the Camberley Wing occupied Minley Manor and the Sandhurst Wing was incorporated in the Staff College.

Buildings

Camberley

In 1858, Her Majesty instructed James Pennethorne to design a building to house the Staff College at Camberley. Pennethorne was one of the most noted architects of that period and had designed the Marble Arch, Buckingham Gate, University of London buildings and many other well-known buildings in London. The College was designed in the modern Italian style of architecture, the main feature being the entrance hall which is designed on the lines of a Roman bath. The entrance hall is now decorated with lances gay with pennons, black Spanish Armada armor and cuirasses, and pistols worn and used on the field of Waterloo.

From the entrance hall are passages leading the whole length of the building. On the left as one enters, is the main stairway of Craigleith stone, mounting to a gallery with an ornamental balustrade overlooking the entrance hall, and from this gallery a corridor with officers' rooms opening off them, runs around the whole of the first floor. The interior walls and Ionic columns, supporting the gallery, are of Corsham stone and the corridors and column bases of Portland stone.

The plans were approved by the Queen in 1859 and on 14 December, that same year, the foundation stone was formally placed.

The College was nearly completed by autumn of 1862 when the students moved in. The building was originally designed to house forty officers and consisted of a ground floor, first and second floors. In 1913 an additional floor was added, faced with slate, but Rawlinson Hall and the covered entrance to it were not completed until after the outbreak of World War I.

The College at Camberley consists of the college building in which is located the headquarters of the Staff College, headquarters of the Camberley Wing, library, one of the lecture halls (Allenby Hall), living quarters and mess facilities for two-thirds of the students and Directing Staff; Rawlinson

Hall, the main lecture hall, is located directly in rear of the College, and connected to it by an enclosed passage. Another building was erected in 1939 just in rear of Rawlinson Hall in which is located the syndicate rooms and the drafting department.

Minley Manor

Minley Manor, in which is housed one division of the Camberley Wing, was built in the early 60's and is a reproduction on a slightly reduced scale, of the Louis XII Château de Blois on the Loire. The estate of 2,500 acres was bought by the War Office as a training ground in 1936, but the house remained empty for some time until General (then Major General) Sir Bernard Paget, K.C.B., D.S.O., M.C., secured approval for its use for the Senior Division of the Staff College, which trained officers for general staff officers grade one (GSO 1). After considerable interior alterations, it was opened by H.R.H. The Duke of Gloucester in January 1939. At the opening of the war in 1939 Minley still housed the Senior Division and subsequently one of the three divisions of the Camberley Course.

The Crest

In 1868 the Owl, representing wisdom, surmounted by a crown was adopted as a crest,

and "Tam Marte quam Minerva" (As much by Courage as by Genius), as a motto. The symbol of the Owl was an appropriate choice, though probably a pure coincidence, for the family arms of Le Marchant, were a chevron between three owls.

Technological developments have made the armed services much more dependent upon each other than ever before. The boundaries that once separated the Army's battlefield from the Navy's battlefield have been virtually erased. If there is ever going to be another global conflict, it is sure to take place simultaneously on land and sea and in the air, with weapons of ever greater speed and range. Our combat forces must work together in one team as they have never been required to work together in the past.

No aspect of military preparedness is more important than scientific research. Given the limited amount of scientific talent that will be available for military purposes, we must systematically apply that talent to research in the most promising lines and on the weapons with the greatest potentiality, regardless of the service in which these weapons will be used. We cannot afford to waste any of our scientific resources in duplication of effort.

—President Harry S. Truman

Preparation of Military Analytical Studies

LIEUTENANT COLONEL BENJAMIN F. BOYER, *Infantry*
Former Chief, Training Division, Command and General Staff School

V-J-DAY meant more to the United States Army than victory over Japan. It changed the emphasis in military education. Prior to the date, at least at the Command and General Staff School, the stress had been on the teaching of techniques. The question which army instruction sought to answer was "*How* is the job done?" Time had not been available to teach *why* the job was performed in a particular way. With the defeat of the Japanese, it again became possible to teach the background of staff procedures, including both the *how* and the *why*.

Beginning on 1 October 1945, the First Command Class was held at Fort Leavenworth.[1] That course covered twenty and one-half weeks. Fourteen weeks of that time were spent by the students in research on military subjects.

The stress so given to military research highlights the important role which it will play in future military education. Of particular importance in any future educational program will be the military analytical study. Such studies provide needed information on which higher commanders will make their plans. But if the higher commanders are to receive such information, their staffs must know how to prepare and present it.

The remainder of this article consists of a résumé of the methods of preparing such studies. It is submitted as an aid to others who engage in similar tasks or who themselves prepare such studies.

There is a "devastating belief that a research paper is a mysterious collection of documented sentences; that bibliographies, note cards, and footnotes are the works of the Devil expressly invented to harass" the student.[2]

As Schmitz says, "Research can easily become something darkly mysterious if a worker proceeds without knowing the rules. Research combines both diligence and care. It is the diligent search for facts or principles, and the careful and critical examination of them. There is no specific rule which can produce either diligence or care, but there are rules which may assist the pursuit of those ideals in research".[3] Basically, research involves three steps: first, the gathering or collection of data and material; second, the criticism or evaluation of the data; and, third, the presentation of the material and the criticism in suitable form for use.

The typical military analytical study consists of a succinct report with supporting references together with a concluding summary or *constructive* recommendation on an assigned subject.

Steps in Preparation of an Analytical Study

If an analytical study is to be of value, it should be thoroughly prepared in accordance with accepted techniques and methods. It is recognized that there are many ways in which one could prepare such a study, but regardless of the method followed, results must be accurate and certain.

There are at least five steps which should be followed in preparing such a study. These are:

(1) Analysis of directive and preparation of bibliography;

(2) Preparation of tentative outline and revision of bibliography;

(3) Development of data;

(4) Preparation of final outline; and

(5) Preparation (writing) of the report.

A discussion of each of these steps will insure a clearer understanding of one method for productive, effective research.

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[1] Major General Karl Truesdell, "Command Class—Command and General Staff School," MILITARY REVIEW, vol. XXV, no. 9 (December 1945), p. 3.

[2] R. Morrell Schmitz, *Preparing the Research Paper*, p. 1.

[3] R. Morrell Schmitz, *op. cit. supra.*

Analysis of Directive and Preparation of Bibliography

At the Command and General Staff School, the preparation of an Analytical Study begins with the receipt of a "directive." This directive which is prepared by higher authority announces the subject of the study assigned and indicates the lines along which the analytical study is to proceed. In other words, the directive sets a task for the researcher; it also informs him of the factors he should consider in his work.

From the foregoing, it is apparent that there is a marked difference between the initial steps in preparation of a Military Analytical Study and the "research" usually engaged in by graduate students in our civilian universities. It is characteristic of university research that the student selects his own title or subject. Because a student who selects his own research subject takes upon himself a heavy responsibility, much of the discussion in the available books is devoted to a consideration of "how to choose a subject" for investigation.[4]

In preparation of an analytical study for military use, however, the researcher normally is assigned the subject he is to investigate. He is told, in broad outline, the aspects which are of interest to his commander. His job is to present the results of his research in usable form.

The first step in the analytical study is the analysis of the directive. In research, as in many other fields, a plan for the procedure to be followed in completing the task must be established early. If this is done a thorough and orderly coverage of the subject is insured. The analysis of the directive is essential to the orderly preparation for research.

One who analyzes a directive engages in concentrated thinking on the subject; he examines the problem in an endeavor to resolve it into its constituent elements; he considers the separate parts of the directive in relation to the directive as a whole. Such action insures a clear understanding of the research task. The result should be a thorough understanding of the mission assigned.

Along with the analysis of the directive there should be the preparation of a tentative bibliography. At the Command and General Staff School the Library has been accustomed to prepare tentative bibliographies of the pamphlets and books available in the Library and the ephemeral material on file in School Archives. Such bibliographies are not limitations on the material which may be used; rather, they are guides to the materials at hand.

If no tentative bibliography is available, the researcher will have to prepare one of his own.[5] The preparation of a tentative bibliography at this stage helps orient the student in the analysis of his directive.

The analysis of the directive, accompanied by the preparation of a tentative bibliography or the evaluation of one already prepared, marks the first step in the preparation of the military analytical study. The result should be a comprehension of the task to be performed and of the material available.

Preparation of Tentative Outline

The analysis of the directive indicates the direction the military research is to take. The second step in the analytical study is the preparation of a tentative outline. Because military studies are often assigned when there is a desire for their early completion, it is necessary that the researcher plan his work so that he will conserve his time. System and order in such research are essential. Otherwise the student will find himself straying down interesting side roads which beckon him on, but which divert him from his main objective. If he has a well thought out plan of procedure, however, he will have charted the course to follow; he will not stray. A first concern then is to

[4] See, for example, Hockett, *An Introduction to the writing of American History*, pp. 1-8; Whitney, *The Elements of Research*, pp. 66-93; Hubbell, *Writing Documented Papers*, pp. 1-19; Schmitz, *Preparing the Research Paper*, pp. 3-8.

[5] See Schmitz, *Preparing the Research Paper*, pp. 29-32; Whitney; *The Elements of Research*, pp. 94-104.

devise a plan that will guide him in the collection of needed data.

When his subject has been selected or assigned, the student should decide what he proposes to do with it. He should prepare an outline. Of course, the outline at this stage of the inquiry will be only tentative. It should divide the subject into logical parts with appropriate subdivisions. It will be satisfactory if the outline is in generalized form only, though the more detailed it is the more easily the subject will develop later. It is not necessary that the researcher have reached his conclusions at this stage.

Indeed, conclusions or recommendations usually come only at the end of the research and thinking on the subject. What is important is that the researcher set down on paper an outline. With the outline one is able to systematize the process of gathering materials; without it, much valuable time may be wasted.

The tentative outline plots the course to be followed in the research maze. Its preparation gives assurance that time and energy will be conserved and that effort will be directed along worthwile and profitable lines.

Development of Data

The search for material and the development of data so secured is the third step in the analytical study. This search for material is usually conducted through an examination of relevent data unearthed in the preparation of the bibliography. It is customary to record source data on bibliography cards.

A bibliography card (available sizes range from 3″ x 5″ to 5″ x 8″) is prepared for each item listed in the bibliography. A word of caution about the entries to be made on these cards. Enter only one reference on each bibliography card. Thus cards can be arranged and rearranged without the necessity of copying or recopying the bibliography card. The notes to be entered on the bibliography card at this time are relatively simple. They include only three items: (1) First line: the name of author, if known; (2) Second line: the title of the book; (3) Third line: facts relating to publication, including place, publisher and date.[6] Prepare one such bibliography card for each source contained in the bibliography, whether it be a book, magazine article or pamphlet.

When the bibliography cards are completed, the researcher should examine each of the references listed. Scan them hastily to determine whether it will be worthwhile to study the material closely. Make a suitable entry on the bibliography card, indicating whether you desire to study the individual citation closely.

Next go through the entire list of bibliography cards and eliminate those which are believed to be without value in the research project. Then proceed to a detailed examination of the sources which seem to be worthwhile.

It will also be helpful if, as you examine each of the sources listed, you number the bibliography card for that source with a circled arabic number, placed in the upper right hand corner of the bibliography card. This number is for use in connection with the "note cards" which will be described later.

One is now ready to make an exhaustive study of the available material. This requires the careful and systematic recording of all facts (and opinions) which are discovered. To do this it is suggested that a set of "note cards" be prepared. One should not confuse these note cards with the previously described bibliography cards. The bibliography cards describe the sources which are to be examined. On the note cards one records the data obtained from a study of these sources.

Like the bibliography cards, the note cards should contain three items of information. These are: (1) a "catch line" to indicate where in the tentative outline the material belongs; (2) the source from which the in-

[6] R. Morrell Schmitz, *Preparing the Research Paper*, pp. 29-35. The system described here is based upon suggestions contained in Schmitz's work.

formation was obtained; and, (3) the information itself.

The "catch line" gives a ready indication of the general place of the information in the entire project. The *source* can be indicated by a circled arabic number placed in the upper right hand corner of the note card. This number should correspond with the number previously placed in the upper right hand corner of the bibliography card. Such a system makes it unnecessary to recopy the source reference. As indicated previously, all of the cards in the revised list of bibliography cards will have been numbered consecutively. Thus the number assigned to any particular bibliography card can be used on all note cards on which information from that source is recorded.

Information placed on the note cards should be complete. It is better to err on the side of detail rather than to be cryptic. Otherwise, the notes may grow "cold". If that happens, time is lost in re-examining the source material. Notes should be taken on all statements of opinion and on all facts that are not matters of common knowledge.

When available materials have been exhausted, or time presses, and not until then should one start to *write* the study. The Army War College thus stated the reason for this: "This entire plan (of gathering all materials before beginning composition of a monograph) is based upon the formula that research is intake and analysis, writing is output and synthesis; the two operations thus oppose each other and therefore, one should not begin until the other ends."[7]

Final Outline

There is an additional step which must be taken before the analytical study is reduced to written form. That step is the preparation of the final outline. This final outline must be differentiated from the working outline which has guided the research for the study.

At this stage one should be well prepared to draft such a final outline. He has thought through the problem and has worked with all available materials. But constructive thinking is required. Such thinking is aided by changing the tentative outline (which usually is prepared in topic form) into a sentence outline. By expanding each topic word or phrase into a complete sentence, clarification of thought is achieved.

One may now decide to rearrange the sequence of his study. Some parts may be added, others may be dropped. This is to be expected, for the writer now is much better informed on his subject.

A number of advantages accrue from the preparation of a working outline. Hockett, in his well known book, "An Introduction to the Writing of American History," has enumerated them as follows:

"It (the working outline) will serve as a guide in writing and in perfected form, it will become the analytical table of contents which the completed monograph should contain. Moreover, working it out will encourage a thoughtful review of the whole body of material, which should yield the following excellent points: (1) mastery of the data, (2) clear perception of the relation of the parts of the theme to the whole, (3) certainty that sound conclusions have been reached, (4) clear definition of all objectives. No writer should set pen on paper until he knows what he can do with his material, and such review and outline are essential preliminaries to rapid and accurate writing. With such preparation, the actual effort at expression in fitting language will also help clarify the ideas still futher."[8]

This outline should be divided, in a logical way, into main and subordinate parts. Each major division should have either a chronological or topical unity of its own. The plan of the outline will be determined by the characteristics of the material as revealed by research. Logics and the outline will dictate just how, in the final study, these materials are employed. Re-working the outline insures

[7] Army War College, *The Preparation of Monographs*, 1928.

[8] Hockett, *op. cit. supra*, p. 112.

that the study will have coherence and that it achieves the mission set in the directive.

Preparation (Writing) of the Report

To be complete, the study must be reduced to written form. This is the fifth and final step in its preparation. The prime object of such a study is to provide information. The analytical study is not meant to be presented as an after-dinner speech; neither should it be argumentative. It should possess clarity. This means that it must be accurate, concise, and as brief as the nature of the case will permit.

The documentation (by which is meant the citation of the exact source of all materials used) is very important. If one is to be fair with his reader, he must give the sources of his information. Such practice permits the reader to verify the citations if he so desires.

The following routine will be of assistance to one who is faced with the task of writing the report for an analytical study:

First, write a rough draft, employing the note cards which have been completed for contents and the revised outline for a guide. *Second*, when any material is incorporated bodily in the draft, indicate the source in a footnote. *Third*, write this draft quickly, emphasizing thought content rather than grammar and style. *Fourth*, rewrite the study; this time the emphasis should be on punctuation, paragraphing and style. *Fifth*, prepare footnotes which include references to all sources used in the study. *Sixth*, prepare the bibliography, being careful to include every item cited in the footnotes.

The completion of the bibliography together with the preparation of all necessary charts, maps, graphs, pictures, or other material which should be included in the report completes the military analytical study.

Summary

Five steps are included in the preparation of an Analytical Study for military use.

First is the analysis of the directive. This helps determine the mission which is assigned. By this analysis the writer discovers where he is to go. *Second* is the preparation of the tentative outline. By this, one decides into what major and minor parts the assigned subject should be divided. This gives the framework on which to build the research structure. Along with these first two steps is the preparation of a bibliography of source material which is to be exploited. *Third* is the development of available data. Here bibliography cards should be prepared on all available materials. Examination of these materials results in the elimination of sources not likely to be of assistance. The remaining bibliography cards are numbered in sequence and the sources examined in detail. Note cards, keyed to the bibliography cards, are used for jotting down all necessary reference data. *Fourth* prepare the final outline. If research indicates that a revision or rearrangement of the outline is necessary, make the changes at this stage. *Fifth* is to write the report, using the final outline as a guide and the note cards as sources of reference. Make a final draft of the study and prepare the bibliography and any indicated charts, maps, or statistical tables.

By following the procedure outlined herein, the military writer or researcher will insure that he covers his subject thoroughly, that the sources are fully utilized, and that his commander will receive the information needed to permit him to make the decisions that are indicated.

As more and more reports and histories become available, the military role will increase in scope and complexity. As it does so, the need for utilizing appropriate research techniques will become imperative. Abundant source material coupled with proper research techniques will insure a thorough comprehension of the actual problems involved.

Supply Problems of an Infantry Division in Mountain Operations

MAJOR LETCHER WIGINGTON, JR., *Infantry*
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ALTHOUGH supply is an important factor in any ground type of operation it warrants particular attention when operating in mountains. The basic reason for this is not hard to understand.

Sustained combat operations cannot be carried on without supplies. The normal channels of supply require road nets, and the expectancy that our motor transport will make hauls directly up to our front lines. We quickly found that this would not work in the mountains. We learned that we had more vehicles than we had roads. We found that the roads ended and the supplies still had a distance to travel before reaching troops.

For these reasons an infantry division must incorporate into its mountain operations plans certain essential changes in organization, equipment, and operational system.

We might well enumerate what we have learned from this war along the following three lines:

Equipment
Organization readjustment within the division
Modifications in the usual supply plan

Most of the several items of equipment essential for mountain operations have been developed over a period of years by research, but much more extensive development will be necessary before our desires are fulfilled.

The packboard is used to facilitate an individual to carry supplies over difficult terrain. The exact weight of the load and the speed and length of march are dependent upon the individual soldier, the terrain, and the weather. A load of 50 pounds can be carried with comparative ease by an average man. Loads of about 100 pounds can be carried for short distances over moderate terrain difficulties.

The packboard cannot reduce the weight of the load, but it distributes the weight over the man's back, making it easier to carry. The packboard is used over terrain which vehicles and animals cannot travel. It does not answer the problem one hundred percent, but it is the best means that we have developed at present for man-carrying loads. It was the only solution while we had to fight in the mountains, but did not solve the problem fully. The infantry battalion, while operating in such terrain, is usually overextended and under strength. The battalion needs every available man to hold the position, yet someone has to furnish men to carry supplies. It takes about 20 men per rifle company to keep supplies carried forward which means almost 100 men absent from the battalion. The usual situation does not permit such a drain from the combat strength. Some divisions used their antitank company personnel, others used replacements. The answer was never solved satisfactorily. It often resulted in the battalion eating one-third of a ration each day for several days. After weeks of it their fighting efficiency dropped considerably.

The M1 gasoline burner was the most treasured piece of equipment the soldier could have. Money would not make him part with it. Anyone familiar with a soldier's desire to discard equipment in combat will realize that there was a definite reason for prizing this pressure burner so highly. The stove was the difference between cold C rations with no hot coffee, and hot meals. Sitting in his foxhole on a high, windy, cold peak, the soldier becomes chilled throughout. This lasts day after day with the added discomfort of rain and snow. Finding shelter in his foxhole or behind some rocks it was possible to heat C and K rations with a pressure burner, and have frequent hot coffee, thereby allaying some of the misery of his surroundings. He is able to remain far more alert and in better physical condition. His morale will remain much higher than is expected amid such environment.

If it were possible for each rifle squad to be issued two of these stoves the men would find a way of putting them to use and overcoming the imaginary gasoline problem. A five-gallon gasoline can will refuel an infantry battalion's burners. Before the war most of our G-4's would not have considered such an issue as being of major importance, but their belief was a fallacy. Such matters are most important. Frequently they are the difference between taking and not taking the next objective.

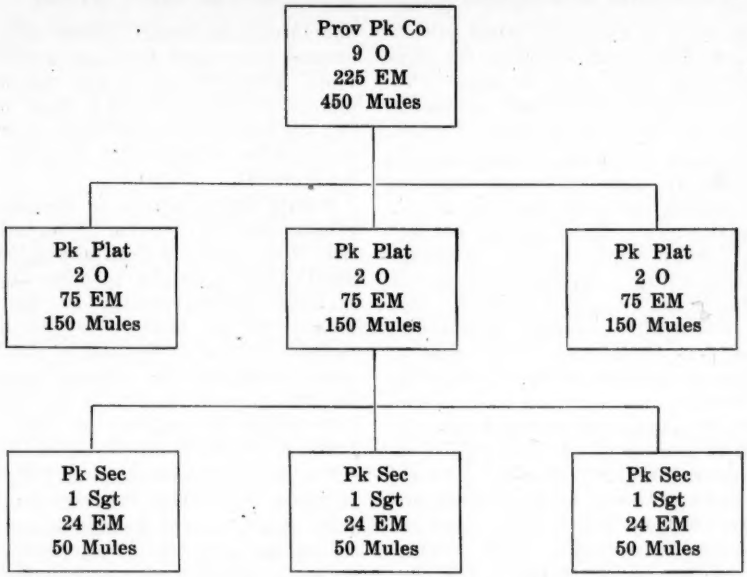
The answer of what to give a soldier to wear in mountain fighting is not an easy one. During the day while the sun is shining he gets miserably hot and perspires climbing peaks. At night when the battalion has gained its objective and is ready to dig in, the air becomes too frosty to allow adequate rest, or even to stand guard comfortably. It may rain for weeks, filling the foxholes with water. During periods of this type there are as many non-battle casualties as there are those due to battles. Trench foot takes the greatest toll. The soldiers found that the combat suit was an excellent piece of clothing. By carrying the combat suit, one blanket and a shelter half on their backs during the day, it was handy to wear the suit and roll up in the blanket at night. In this manner, with warm food, it was fairly easy to exist. The one exception to this was the man's feet. Unless he is able to warm and dry them occasionally he will inevitably become a trench foot case. It is imperative in G-4 planning that issuance for a large number of socks be allowed. A new pair for each man each day would be satisfactory.

The doctrine for communications is that higher headquarters will maintain contact with lower units. This was often violated in mountain operations for several reasons. First, because a regimental communications platoon is not large enough or does not have sufficient equipment to lay wire to three battalions which have started marching cross-country away from the road nets. The combat wire 130 is not strong enough and the 110 is too heavy to carry over steep hills. The inevitable will invariably happen once the wire is in. The mule train will cross it, thus shortening the lines. In a stalemated situation wire was laid with success quite often. In a moving situation and away from the road nets, radio seemed the only dependable means of communication.

A tracked vehicle should be developed which will traverse almost any ordinary mountain, with the sole purpose of laying wire. Such a vehicle should be easy to develop and would be invaluable to any regimental communication platoon. The battalion would also be able to use such a vehicle for wire-laying. When there was a short delay in advance it would be possible for the battalion to lay to companies.

There are many front line reports on the effectiveness of our horse and mule pack trains for supplying in mountain combat. We have to agree that there comes a time in mountains where roads cease to exist. It is in areas of this type that we have fought and will fight again. On such occasions man must go back to the beast of burden for his pack carriers. Units reported different methods of organization and handling of pack trains but they all used them. The various units in Italy and even in Burma varied in their reports as to the number of animals required to supply an infantry battalion. Some reported as low as 30; others as high as 300. It depended on the terrain, climate, the animals and their training as well as the training of the soldiers charged with their care and use. We can evolve a few conclusions after long study of battle reports: (1) The mule trains should be well trained for their job. (2) American mules are best. (3) The mule skinners should have much training before they are called upon to operate in combat conditions. Too many times the animals had no training and neither did the men. The combination was very much like what you would expect. (4) The Phillip pack saddle is best for our use for hauling supplies. A well-trained American mule can carry about 200 pounds over steep terrain. I believe the organization of an American mule pack train should look something like this:

Organization of Provisional Pack Company



The provisional pack company should be an organic part of the infantry division in mountain warfare. The pack platoon would be attached to a regimental combat team. The pack section would be attached to an infantry battalion. The number of mules would have to be increased as the terrain and climate required. In areas where long distances were involved the animals might have to be two or three times the number indicated above. The training of an organization of this kind is most important. If you put civilians into uniform and hand them a rifle with no leaders to guide them you could rightly expect poor results. We did almost that in this war with our pack trains. We must admit that the situation required it. Should we be caught again?

The G-4 normally controls the use of all supply vehicles in the division. The road net is so inadequate that vehicles become a block to the advance of the division. Mountain roads are narrow, winding, and easily blocked by the enemy. The motors of the division are caught on the roads and supply vehicles are stopped or their movement impaired. We suggest that the motors of the division be pooled in the provisional transport company. These vehicles are the collection of all the motors except those of the combat trains. G-4 has direct control, then, of all the surplus vehicles within the division. In this manner he can keep them off the roads until he needs them for supply purposes. They are more available on a quick call from G-3 also. As to a suggested modification of an infantry division for mountain operations, we believe that there can be no final answer until the exact locale for the operation is known. However, one principle involved is: Pool the transportation under G-4's control.

Tank-Infantry Action

From an address by Major General E. N. Harmon, delivered in connection with the 2d Armored Division Tank-Infantry Demonstration at Alsdorf, Germany.

THE secret of successful attack is close coordination of all means at the right time and place. Time must be taken to coordinate thoroughly and to have all leaders understand the details of the plan of action.

Tanks should, in all cases where terrain is negotiable for them, habitually lead and take the brunt of the battle; and the infantry must come up as rapidly as possible and support the tanks closely on all objectives. Where there is little cover between objectives, and distances are great, it is necessary that tanks move rapidly and that the infantry meet the tanks on objectives under cover of smoke, fire, or darkness. Where distances between objectives are small or good covered positions exist, tanks will normally wait for the infantry to catch up and thus assist them over the ground. Infantry must not be caught on the backs of tanks under shellfire and small arms fire nor follow tanks so closely that they will be caught under shellfire directed at the tanks. Distance will vary with the terrain; however, it should normally be approximately two hundred yards.

Medium tanks will ordinarily lead the attack, followed by the infantry with some light tanks in front and some in rear of the infantry lines. There should always be some tanks in rear of the infantry which can come up forward to attack selected targets that may be passed over by the forward troops. In darkness or foggy weather, on the other hand, the infantry must lead the attack and the tanks will follow closely, ready to shoot when light conditions permit. In some cases it is better for tanks to remain formed in rear and come quickly forward on call by the infantry, thus reducing the chance of the infantry's being subjected to artillery fire occasioned by the noise of the approaching tanks. For heavy attack, the greatest amount of direct fire-support possible should be created by utilizing tanks and tank-destroyers on the flanks of the attack.

Breaking formations down into too small units should be avoided. Tanks should never operate in strength less than a platoon, for tanks dissipated are tanks wasted. Tank movement must be covered by direct tank fire: i.e., the overwatching principle—some tanks shoot while others bound forward. This is fundamental.

Efforts should always be directed toward getting some tanks in rear of the enemy position. When this has been accomplished, the fighting will generally be over. Towns, for example, should normally be encircled by tanks with the objective of reaching the farthest exit and blocking it while some tanks accompany the infantry directly into the town to assist in mopping up. Some tanks from the blocked exit can turn back into the town and attack the enemy from the rear.

The chain of command should follow branch channels: i.e., orders to subordinate tank units should be given through the senior tank commander, orders for infantry units through the senior infantry commander present. This system is best for proper employment and for communication.

Communication between supporting arms is vital. Prearranged plans must be worked out ahead of time. Infantry company commanders will often ride in the tank of the tank commander supporting them. For efficient air support, the air observer should ride in a tank far enough forward to see the formation to the front. Artillery forward observers must be in tanks accompanying the assault tank company commander. Artillery fires should be capable of being massed to the maximum extent possible on any point on the battlefield. This means forward observers of the basic supporting artillery battalion should be hooked up so that the fires of other battalions can be brought in on their target on call.

Tank destroyers should support the attack from one "hull-down" position to another, coming up fast as successive objectives are gained. Tank destroyers are normally broken

up into platoons and are either attached to or placed in support of tank companies and infantry companies. Their main purpose is to provide heavy direct gunpower on the battlefield.

On defense, physical contact between infantry and tanks must be maintained. The man in the foxhole must know where the tank nearest him is located and the tanker is uneasy at night unless he knowns the infantryman is covering him. Defensive positions and all objectives must be quickly and efficiently organized to meet counterattacks. This requires a tie-in of local communication, a local plan of action, and physical contact between small units up forward.

Special provisions must be made, prior to an attack, for assisting tanks over obstacles, and this must not be left to chance. Tanks must frequently come out of the fight to replenish ammunition and gas, so provisions must be made for reserve platoons to exchange with forward platoons in order that there will be no interruption in tank support. The spectacle of tanks leaving the battlefield for ammuniton is often demoralizing to our infantry in a hard fight. This can be avoided by proper forethought and timing.

In a hard fight it is better and less costly to rush the hostile position and take heavy initial losses than to act with irresolution and over-caution which results in failing to take the objective and in accumulating large losses all during the day.

Prior to World War II there was little teamwork between the Army and Navy insofar as actual preparation for combined operations was concerned, although all our war plans called for landings on foreign shores. The Army received no training in amphibious operations worthy of the name. Actual war was necessary before combined training was properly initiated. Such lack of cooperation is inconceivable when examined in the light of General MacArthur's historical return to the Philippines and General Eisenhower's overpowering advance from North Africa to Berlin. Each of these advances involved innumerable amphibious assaults on hostile shores and was conducted, with but one exception, by the employment of Army Divisions with their supporting troops. I personally cannot foretell the day when the defense of our country will not require the amphibious training of units of the Army. Such training should consist not only of initial landing exercises for the air, ground, and naval forces, but of their continual combined employment in subsequent inland operations. I recall an outstanding example, from the many which combat has produced, where teamwork subsequent to initial landings was required between the services. Shortly after landing at Salerno, when we were gathering a foothold on Southern Italy, the Germans counterattacked in force with tanks and armored vehicles. The plight of our landing force was desperately serious when, through liaison with supporting naval craft, devastatingly effective fire was delivered well in from the beach on the attacking panzer units. Later, when captured, enemy prisoners taken from these units stated that they were far more perturbed by the covering fire of the Allied naval escort than by aerial attacks. They found advance through such fire impossible. It was, then, naval gunfire support in this particular instance which proved to be a major factor in our victory on the beaches of Salerno.

—General Jacob L. Devers

The First Brazilian Fighter Squadron

MAJOR DIONÍSIO CERQUEIRA DE TAUNAY, *Brazilian Air Force*

THE idea of sending a combat aviation unit to Europe originated with the heartfelt desire of the Brazilian people to fight shoulder to shoulder with their comrades whose ideals and objectives are held in common, thus participating actively in the war and adding our modest contribution to the immense power of the Allied nations.

With this we wished to affirm to our permanent allies, the North Americans, our unshakeable decision to honor the commitments freely assumed for the defense of our hemisphere and democratic institutions, menaced as were the principles of liberty, in a world devastated by fascism.

The Brazilian public's enthusiasm to participate in the fight in Europe found an appropriate echo in the men of the Brazilian Air Force, particularly in the man in whose hands lay the destiny of this force, the Air Minister of Brazil, who decided upon the organization and components of a fighter squadron to be sent to the European Theater of War.

We had already found ourselves in the antisubmarine campaign off the South Atlantic coasts, and there we had proved that we knew how to fight, and if more extensive economic and military resources were at our disposal, we would throw all our enthusiasm in putting them to good use toward the enemy's defeat.

The squadron was placed under the command of Lieutenant Colonel Néro Moura, one of Brazil's most competent and experienced officers in military aviation, and was staffed with personnel trained by the *Escola de Aeronáutica dos Afonsos* (Afonsos' School of Aviation), Brazil's Randolph Field, and with noncommissioned officers, specialists from the *Escola de Especialistas de Aeronáutica* (Specialists' School of Aviation). Both of these schools, although following American methods of instruction, were staffed exclusively by Brazilian officers.

After being organized in Brazil, the squadron was sent to the Panama Canal Zone to receive special fighter training with the 6th Air Force. The squadron arrived in Panama in March 1944 and remained there until August, when it was transferred to the Suffolk Air Base, where it was trained in P-47 Thunderbolts that would be used in the Italian campaign.

Having completed this training and passed various inspections, the squadron moved through a port of embarkation on the Atlantic coast, en route to the Mediterranean Theater of Operations, their destination. They arrived in Livorno on 6 October 1944, leaving immediately for the air base at Tarquinia, where they were based. On the 31st, after being trained in the tactical doctrines of the Theater, the 1st Brazilian Fighter Squadron began its combat operations which were to end only with unconditional surrender of the enemy forces in Italy.

The squadron was attached to the 350th American Fighter Group, commanded by Colonel Nielson, which was part of General Israel's 62d Wing, one of the components of the 22d Tactical Air Command, under Brigadier General Benjamin Chidlaw.

The 22d TAC together with the British Desert Air Force constituted the principal elements of the 12th Tactical Air Force, which was under the command of Major General John K. Cannon, a great leader and sincere friend of the Brazilian pilots to whom he extended true friendship.

The missions flown by the 1st Fighter Squadron were characteristic of the final stages of the Italian campaign, when Allied air superiority had been definitely assured. The tactical aviation's main effort, therefore, was to isolate the battlefield, endeavoring to destroy the enemy lines of communications in direct support of the Allied armies in their operations.

Thus the squadron undertook dive bombing missions against the enemy lines of communications at their most vital points, positions which were uniformly and strongly defended by the precise and efficient German antiaircraft fire; escort of medium bombers; armed

reconnaissance flights; machine gun and rocket strafing missions against vehicles and troop concentrations; weather reconnaissance flights; Fifth Army zone air defense, etc.

In December 1944, the 1st Fighter Squadron was transferred to the airfield near Pisa, where it remained until the end of the Italian campaign.

The squadron took part in the successive campaigns of the final Allied drive against Marshal Kesselring's German Army, which included interdiction of the lines of communication linking the German combat zone with the zone of the interior, principally at the Brenner Pass; direct support of the Fifth Army's attack to secure better positions in the direction of the La Torracia and Castello hills; and finally in the advance which led the 15th Army Group to final victory, it initially gave direct support to the British Eighth Army, the first to advance in the conquest of the Po Valley, and then was transferred to direct support of the Fifth Army.

During all of these operations, the squadron functioned as an American one, following all of the American Air Forces' tactics, doctrines, organization, and methods, although the green and yellow of the Brazilian colors were on the wings and rudders. The desire to do it right, and the enthusiasm and intelligence of the Brazilian pilots led to their rapid understanding of the English language, and thus in all the operations, the squadron's flights maintained constant touch with the Tactical Control Center, radar stations, advanced front line observers, and traffic control towers at the airfields.

During their activities in the Theater of Operations, the percentage of losses for the squadron was 0.8 percent per sortie. Nine pilots were killed and several others were saved through the use of parachutes or forced landings, many of them in enemy territory. The damage inflicted on the enemy was:

	Destroyed	*Damaged*
Motorized vehicles	895	615
Railroad cars	131	746
Locomotives	31	60
Ammunition dumps	82	
Gasoline dumps	73	
Railroad lines	507	
Radar stations	6	
Artillery positions	87	
Gunpowder factories	18	
Airfields	9	
Animal-drawn vehicles	729	
Bridges	219	

The Brazilian pilots called themselves *Aves Tenses*, an expression which evolved from a curious attitude of the Brazilians on their first visits to the United States, where they always went around together in order that the one most versed in the English language could serve as an interpreter for the rest.

The Brazilian's battle cry was *sente a pua*, a vigorous expression in the Portuguese language, but without an exact English translation, meaning more or less, the British "tallyho."

During their stay in Italy the Brazilian pilots received the warmest expressions of friendship, interest, and admiration from the American authorities, and in his New Year's message to his Mediterranean units, Lieutenant General Ira Eaker, Commander of the Mediterranean Theater Air Forces, crystallized the thoughts of his comrades when he particularly cited the 1st Brazilian Fighter Squadron for its contribution to the Allied victory.

Control of the seas and skies above them proved without question the deciding factor in bringing Japan to her knees. I am confident that a powerful Navy, supported in the same loyal fashion by the American people, will prove equally essential in maintaining the peace and keeping our country safe and strong.

—Fleet Admiral Chester W. Nimitz

Third Army Quartermaster Operations

COLONEL E. BUSCH, *Quartermaster Corps*

Planning in the United Kingdom

HEADQUARTERS Third Army was established at Knutsford, Cheshire, on 23 March 1944. During the three months in England, every moment was utilized in preparing plans for the Continental operation. The principal Quartermaster tasks included:

1. A study of the plans of higher headquarters.

2. Preparation of "Administrative Instructions Preliminary to Mounting."

3. Drafting "Quartermaster Annex 15" to accompany "Third United States Army Outline Plan, Operation Overlord."

4. Preparing and processing prescheduled requisitions for maintenance and reserve build-up for period D plus 24 through D plus 41.

5. Settlement of an adequate Quartermaster troop basis to support the operation. This question was the most difficult in many respects of any encountered during the preliminary phase.

The Quartermaster section moved to the Continent in four groups: Advance group, 26 June; "X" group, 6 July; "Y" group, 18 July; "Z" group, 18-26 July. "Z" group was delayed in England to assist in equipping of units, to forward supplies, and to obtain a final settlement of the troop basis.

Pre-operational Phase on the Continent 6 July to 1 August 1944

First United States Army had been engaged on the Continent since D-day, 6 June 1944.

The port of Cherbourg was not open; therefore, the prescheduled requisitions were not filled. First Army held in its custody all the supplies on the Continent in dumps at "Utah" and "Omaha" beaches. Advance Section Communications Zone (ADSEC) although present on the Continent was not operational in a complete sense and did not become so until about the same time as Third Army. There was no opportunity for a warming up, smoothing out period either for Third Army's Quartermaster section or ADSEC; both were to learn the hard way.

Initial supply points were opened southeast of Cherbourg near St. Jacques de Nehou and La Haye du Puits and, with the cooperation of First Army, stocked with a reserve of 1,500,000 gallons of gasoline plus a quantity of allied products, 1,5000,000 operational rations and a fair amount of clothing and equipment. This modest reserve was all that could be accomplished under the circumstances prior to active operations.

The gasoline pipeline from Cherbourg was completed to La Haye du Puits and began discharging 30 July. The pipehead was advanced to Alençon on 24 August and by successive stages to Mainz in April 1945.

Quartermaster Plan—General

The Office of the Army Quartermaster consisted of nineteen officers, three warrant officers, and forty enlisted men organized into four sections:

	Officers	*Warrant Officers*	*Enlisted Men*
Army Quartermaster	1	—	1
Deputy Army Quartermaster	1*	—	1
Administrative Section	2	1	8
Field Service Section	3	—	6
Graves Registration Section	2	—	6
Supply Section	1**	—	1
Operations	1	—	—
Class I	3	—	5
Class II - IV	2	2	7
Class III	4	—	5

* Deputy Quartermaster acted in dual capacity.

** Operated at transfer point in forwarding supplies. Was assisted by a battalion headquarters, plus occasional attachments as required by circumstances.

Transportation was not handled by the Army Quartermaster but by "G-4, Transportation."

The supply plan required a daily telegram transmitted through the 24th Regulating Station by messenger for Class I and III requirements forty-eight hours in advance. Deliveries during the initial phase were to be made by ADSEC direct to designated Army supply points but thereafter, as the distance increased, only to transfer points in rear of the Army. Army trucks under the Quarter-

master operations officer were to deliver supplies from the transfer point or points to Army supply points serving the troops. Airplane deliveries were to be inaugurated as soon as practicable (initially from fields in the United Kingdom); railway rehabilitation was to be given the highest priority; the gasoline pipeline was to be extended as rapidly as possible and LST's loaded in England were to assist in supplying VIII Corps over the Morlaix beaches near Brest when the situation permitted. Although modified from time to time, the overall plan was followed.

Supply points were maintained on the basis of one or two per corps and two or more for Army troops and miscellaneous units in the rear areas. Troop requirements were submitted to and obtained from the nearest supply point. Supply point commanders made a daily report to the Army Quartermaster by messenger and/or telephone.

Enemy air activity, although in sufficient strength to enforce blackout conditions, was not a serious handicap to supply operations either by day or night during the entire campaign. Drivers became remarkably skilled at blackout driving.

Corps Quartermaster formed a vital link between Army and all troops including divisions under corps command.

Third Army became operational in Normandy at 011200B August 1944, and continued so for 281 days.

Supply of VIII Corps in the Brittany Peninsula

After Avranches fell, VIII Corps moved westward into the Brittany Peninsula while XII, XV and XX Corps moved eastward. Many changes occurred in corps and divisions during the campaign and no attempt will be made to record them in this article. The XII and XX Corps were the only two that remained continuously during the entire campaign; others were in and out.

Under the separate supply arrangement for VIII Corps, rations and gasoline were delivered direct to Supply Points Numbers 7, 9, 10 and 12 in Avranches-Dol-Rennes area to include 9 August; effective 10 August, ADSEC trucks delivered all supplies to Supply Point Number 12. Corps, using its attached truck companies plus unit transportation, made distribution to the units as far west as Brest and south to the vicinity of Vannes. The Army Quartermaster sent a representative to the Brittany Peninsula who, effective 18 August, submitted separate daily requirements to ADSEC for the western force. LST's, loaded in England, began discharging over the Morlaix beaches on 20 August and a few days later railway service was inaugurated. Brittany Base Section, which opened at Rennes 21 August, became responsible for this force at the close of the month.

Supply of Eastern Force During August 1944

Westward of Laval, between 1-12 August, ADSEC and Army trucks, hauling from beach dumps, pipehead, and the initial Army reserve dumps (Supply Points Numbers 1, 2 and 4) delivered supplies direct to Army Supply points. Supply Point Number 6, which opened at 020800B August just north of the crossing at Avranches, was designated as control point through which all convoys were required to pass; here, they were provided with guides by the operations subsection and dispatched forward. When the congestion at the Avranches crossing became so great as to cause unusual delays—a frequent occurrence during the first week—the trucks were unloaded at Number 6 and immediately sent to the rear for another load; thus, this supply point became the first transfer point and did not close until 13 August.

Between 13-31 August, ADSEC delivered supplies to a succession of transfer points from which Army delivered to supply points serving the troops.

Operated By	*Name*	*Location*	*Opened*	*Closed*
ADSEC	Q-55	LAVAL	13 Aug	20 Aug
ADSEC	Q-110	LE MANS	20 Aug	26 Aug
ADSEC	Q-120	ABLIS	26 Aug	7 Sep

Although operated by ADSEC, the Army Quartermaster operations officer had charge of forwarding supplies from these locations by Army transportation. The transfer points frequently were far to the rear due to the

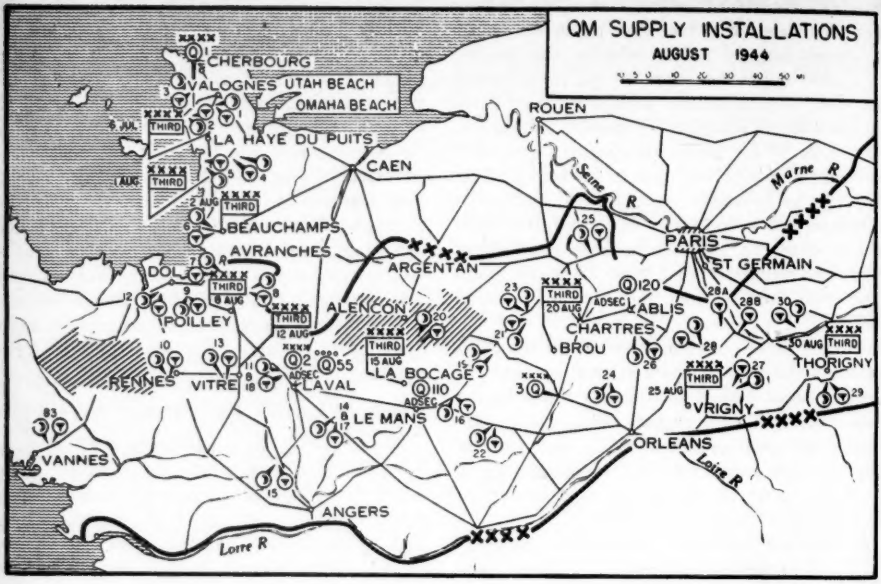


Figure 1.

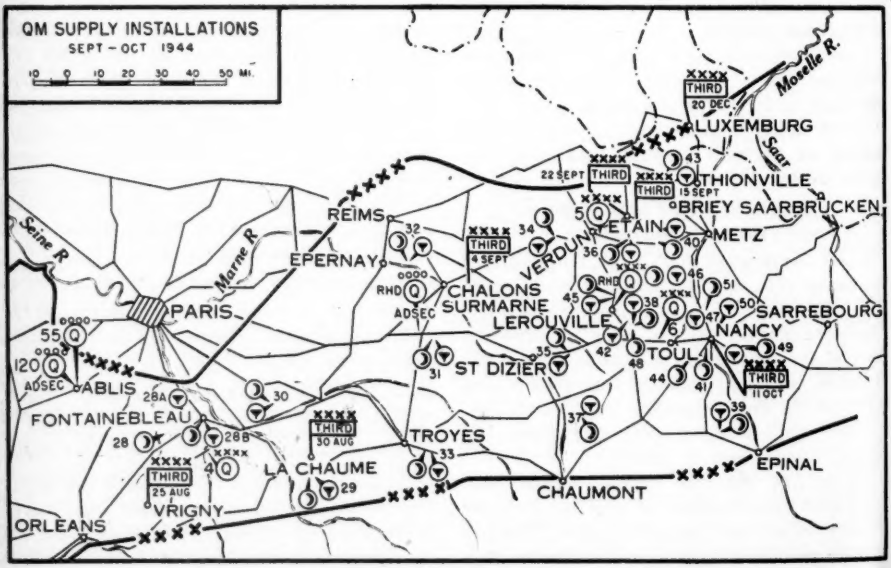


Figure 2.

rapid advance of the Army; the turn-around time on Army trucks was as high as seventy-two hours. It would have been highly advantageous if the transfer points could have leapfrogged each time the Army supply points moved. Army's desire to have ADSEC's installation at Ablis moved east of the Seine River at Fontainebleau could not be attained until 7 September.

Railway deliveries, in limited quantities, were initiated to Le Mans on 17 August; to Brou, 23 August; and to Chartres, 25 August. The main reliance continued to be on the motor truck until October, although the rail tonnage gradually increased.

Airplane deliveries of rations and gasoline were initiated to Le Mans on 18 August and to Orleans on the 27th. The transport plane, the C-47, became increasingly important and frequently made up the difference, especially during the final weeks of the campaign, March-May 1945, when the Army was east of the Rhine.

The two principal obstacles to August operations were lack of adequate transportation and telephone service with the transfer and supply points. Transportation deficiencies were overcome by borrowing from such good friends as Signal, Field Artillery, AAA and Engineer. Supply points in forward areas maintained messenger liaison with the Corps Quartermasters, who kept the Army Quartermaster informed by telephone. The liaison plane was used extensively. Supply point commanders reported to the Army Quartermaster daily. There is no obstacle so great that it cannot be overcome, provided that supplies arrive from the rear.

The ration situation was successfully handled. Short shipments from the rear were made up by exhausting the initial Army reserve on 13 August and using captured stocks. Operational rations were used almost entirely, supplemented with fresh meat beginning 8 August and with fresh bread during the entire period. The bakeries kept pace. Fresh fruit, eggs and Post Exchange rations were issued periodically.

The gasoline situation, although attended by extreme difficulties and anxieties, remained satisfactory until 23 August when a critical period started to develop due to short shipments from the rear. The Army no longer could return to the beaches in emergencies. The month ended with gasoline in critically short supply.

The Army Headquarters moved seven times during the month, the last move being to Thorigny on 30 August. Thirty-four supply points for rations and gasoline, three Class II-IV depots, and five cemeteries were used in support of the operations.

September-October Supply Operations

There was little forward movement during this period. The Army closed up to the line of the Moselle River generally between Thionville on the north and Nancy on the south. The principal offensive action was in the Metz area.

Supply efforts were directed toward improving the lines of communication both in the rear areas and in the Army area, equipping the troops for the winter, and collecting sufficient reserves to support the offensive scheduled for 9 November.

In closing up to the Moselle River, the Army was supplied through successive transfer points:

Operated By	*Name*	*Location*	*Opened*
ADSEC	Q-55	Ablis	26 Aug
Army	28-B (Canning Point)	Fontainebleau	31 Aug
ADSEC	28-B (Canning Point)	Fontainebleau	8 Sep
ADSEC	Railhead-Truckhead	Sommesous	7 Sep
Army	Railhead	Verdun	14 Sep
Army	Railhead	Lerouville	14 Sep
Army	Railhead	Toul	24 Sep

The ADSEC terminus remained at Ablis to include 7 September. In order to bridge the wide gap in the supply line, Army opened and operated the railway line from St. Germain (a few miles east of Fontainebleau) to Sommesous beginning 7 September, to Verdun and Lerouville on 14 September, and to Toul on 24 September. The "Red Ball Express," a truck line operated by ADSEC, delivered supplies from the beaches to Sommesous to be carried forward on the railway.

Truck shipments from the beaches accounted for the bulk of supplies to the Army

via Sommesous transfer railhead during September; however, the railway service was showing great improvement, and before 31 October practically everything was received by railway and the truck line was discontinued except for emergency shipments, principally Class II-IV. Furthermore, the majority of Army supply points were accessible to Army-operated railways before 31 October.

Airplane deliveries were made at intervals, weather permitting, to the following points commencing on the indicated dates: Reims, 5 September; Renneville [about 30 miles north of Reims], 6 September; Etain, 10 September; St. Dizier, 13 September; Toul, 29 September.

Toul became the Army's classification and transfer point on 24 September and remained so until 24 November. Rations were unloaded, classified and reshipped by truck and/or railway to the supply points. Class II-IV depots were in operation at Verdun and Toul.

The ration situation was sound except for short shipments between 8-13 September, but sufficient unit reserves and captured stocks were available. On 9 September, at Homecourt (near Briey), the 5th Division captured 2,600,000 pounds of frozen beef and 500,000 pounds of canned beef—all the property of the Wehrmacht! This was most fortunate. Practically seventy-five per cent of the Army was on the "B" ration before the end of October.

Short receipts of gasoline from the rear which had started on 23 August continued through 3 September. The advance of the Army, which had been uninterrupted since 1 August, could no longer be sustained. Considerable quantities of German gasoline were found and used. Receipts improved on 4 September, and during the remainder of the period the situation was satisfactory. By 31 October, the Army reserve stood at 638,235 gallons in addition to complete unit loads and supply point stocks.

The Army headquarters moved three times during September and October; Châlons-sur-Marne, 4 September; Etain, 15 September; Nancy, 11 October. The forward supply points were close to the west bank of the Moselle River.

November-18 December

This period included the capture of Metz and the advance of the Third Army from the Moselle to the Saar. The supply system was greatly improved through the opening of two ADSEC depots. Depot Q-180 was opened at Reims for Class II-IV supplies. Depot Q-178 was opened at Verdun for Class I supplies on 25 November and for Class III on 11 December. Railways were in reliable operation from the rear and within the Army area were reaching all supply points on the west back of the Moselle. A railway bridge was completed across the Moselle at Nancy on 10 November, permitting railway service immediately to Château Salins, Hampont [about three miles northeast of Château Salins] and Haboudange [about 6.5 miles northeast of Château Salins], and as far as Lening on 10 December. This was the only railway operating east of the Moselle until the Thionville bridge was completed on 3 January.

With the opening of ADSEC's depot at Verdun on 25 November, the Army transfer point at Toul was closed. Class I and III supplies were forwarded from Verdun by railway to designated supply and transfer points in accordance with the daily telegram. All supply points west of the Moselle were served by a railway; however, transfer points were opened at Château Salins and Lening for the supply by truck to troops then on the Saar; another transfer point was at Briey for supplying the XX Corps operating east of the Moselle beyond Thionville.

In preparation for the 8 November offensive from the Moselle, reserves were secreted east of the river at Nancy and Pont-à-Mousson. This proved to be a sound measure because the river immediately reached flood stage and put all bridges temporarily out of commission except one at Nancy.

Having reached the Saar, a new offensive was scheduled for 19 December. Reserves were brought up through the transfer point at Lening, hauled to the Saar and secreted in the vicinity of Saaralben and Sarre Union. The

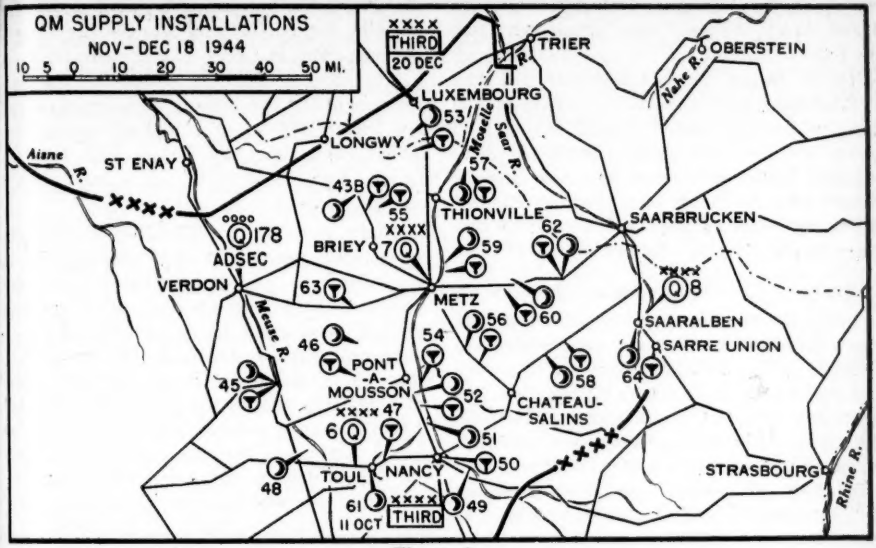


Figure 3.

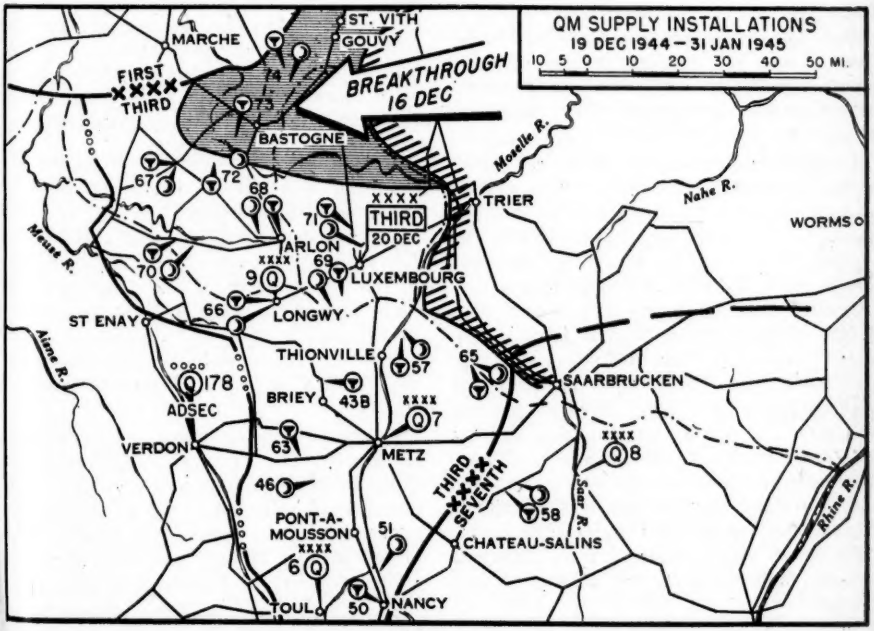


Figure 4.

attack on the 19th was thwarted when the Third Army suddenly was withdrawn from the Saar to counter the German breakthrough in the Ardennes. The reserves that had been so laboriously placed on the Saar were hauled back to Lening, placed aboard trains, and moved to the new front. Some of these supplies ended in one of the new reserve points west of the Meuse River at Stenay. No Army supplies were lost at this or any other time by being overrun.

Change of Front, 19 December-31 January

When the German breakthrough came on First Army's front in the Ardennes on 16 December, Third Army was far to the south and east on the Saar River. Information was received at a G-4 conference at 182000A December that Third Army would move all except XX Corps to the Arlon-Luxembourg area; the 4th Armored and 80th Infantry Divisions were to move at midnight. No reconnaissance had been possible to select suitable locations for Quartermaster supplies. Extremely severe winter conditions prevailed. The Army was based at Verdun for Class I and III supplies and, in addition, Army operated a large-scale canning point at Mancieulles just north of Briey. Army Headquarters was in Nancy.

Longwy, France, was selected *from the map* as the Quartermaster transfer point because of its good rail connections with Verdun and points in the new area, and by 182030 December, after a conference of the Quartermaster staff, the plan of supply was settled. It was arranged by telephone to load rations aboard cars at Verdun and to have a locomotive ready, to load 100,000 gallons of gasoline aboard Army trucks at Briey and Mancieulles; and to alert railhead, gasoline and service troops at Supply Point Number 57, Koenigsmacker (near Thionville). Officers were sent in jeeps with orders to lead and accompany the supplies and service units to the railway station at Longwy. The operations officer was to proceed from Nancy to Longwy, approximately 100 miles, and take charge.

The operations officer arrived at Longwy at 190900, the rations from Verdun and the gasoline from Briey and Mancieulles arrived between 0900 and 0930 and the service units a few minutes later. At 190945 the Quartermasters of the two leading divisions reported, and before 1000 hours were drawing supplies. This switch, concluded in less than fourteen hours, was blessed by an extraordinary amount of good luck.

There were many difficulties during the subsequent operations, due principally to rough terrain and indescribable road conditions in the northern part of the Army area around Bastogne, Gouvy and St. Vith. A convoy of rations and gasoline was pushed through to Bastogne the day after contact was made by the 4th Armored Division. Additional supply points were opened as the action developed, and supply points on the old front were evacuated and closed with the exception of two that were transferred to Seventh Army. A Class II-IV depot was opened on a bare hilltop at Longwy at 231200A December to replace battle losses of our old friends, VIII Corps, who reverted to Third Army on 19 December, and to maintain all troops on the new front. Cemeteries were opened at Grand Failly and Luxembourg on 23 and 29 December, respectively.

February-8 May Supply Operations

During this period the Army remained based on ADSEC depots at Verdun for Class I and III and Reims for Class II-IV. The Army advanced eastward from Luxembourg to the Rhine north of the Moselle, thence south across the Moselle to Worms, thence east across the Rhine and northeast to Chemnitz, thence turned southeast and east across the Danube and into Czechoslovakia and Austria.

During February there were no rapid movements. The Army was supplied by rail direct to certain supply points and by a combination of rail and truck to others. The principal transfer points were Gouvy, Ettelbruck, Bourcy, Mersch and Diekirch in the general vicinity of Luxembourg City.

Early in March the Army dashed to the Rhine in the Koblenz area. Supplies were

hauled from the transfer points in Luxembourg until 18 March, when rail was in operation to Ehrang (Trier). From this time until the end of hostilities, ADSEC trucks were employed to bridge the gap between the off loading railheads and the Army transfer points. Truck haul distances became fully extended for ADSEC, Army and using units; the conditions in this respect were comparable to August 1944.

In order to support the drive south across the Moselle to Worms, supplies were accumulated at Supply Point Number 103 at Mayen and Number 100 at Wittlich because the south bank of the river had not yet been cleared between Trier and Bernkastel. These supplies were transported south of the Moselle as soon as bridgeheads were established.

Third Army crossed the Rhine, unannounced and uninvited, at 222200 March 1945, and on 24 and 25 March, respectively, Army transfer points were opened at Supply Points 105 and 107 on the western bank near Mainz. These points were supplied by ADSEC and Army trucks from the Ehrang railhead until 4 April, when railway service opened to Heidesheim and Nieder Ingelheim near Mainz. Army operated these transfer points until ADSEC personnel could take over on 8 April, on which date the Army advanced its transfer point to Alsfeld (northeast of Frankfurt). ADSEC trucks then delivered from the Mainz railheads to the transfer point. Alsfeld closed on 13 April and the transfer point was advanced to Eisenach. The Army supply distances in the forward areas east of Eisenach and Weimar were extremely long and there were many difficulties imposed by detours around destroyed bridges. The Reichautobahn from Frankfurt to beyond Eisenach was a supreme advantage. Great assistance was rendered by Air Transport Service east of the Rhine; approximately twenty-five percent of the gasoline was received by this method.

The railway bridge across the Rhine was completed on 14 April; a few days later trains were delivering gasoline to points east of Frankfurt, and on 24 April the first train reached Wurtzburg. It requires about ten days for railway service to become reliable after the line is opened.

The rear echelon of Army Headquarters moved from Trier to Frankfurt on 4 April and to Erlangen on 24 April.

A change of tactical plan was announced on 17 April. The axis of advance changed from northeast towards Chemnitz to the southeast via Nurnburg-Regensburg. The operations officer was directed to divert all convoys arriving at the Eisenach transfer point to Bamberg and to proceed there immediately and open a new transfer point. At the same time, a second transfer point was opened at Wurtzburg by diverting supplies direct from the railheads in the Frankfurt and Mainz areas. When railway service began to Wurtzburg on 25 April the Bamberg point was closed and moved to Nurnburg. The final transfer point was opened on 4 May at Regensburg on the south bank of the Danube; however, Nürnberg remained open for supply of troops to the east, including V Corps at Pilsen, Czechoslovakia.

Hostilities officially ceased at 090001B May 1945.

During the period of the campaign, the following installations were operated in support of the Army: Class I supply points, 136; Class III supply points, 137; Class II-IV depots, 13; cemeteries, 14 U.S. and 14 German.

Miscellaneous Notes

Class II-IV: The supply of clothing and equipment in a moving situation is extremely difficult, due principally to the lack of transportation available for this purpose. Depots are difficult to move. The best solution is to include forty-eight trucks in the table of organization and equipment of the Quartermaster Depot Company, Supply.

Rations: The operational type ration is admirably adapted to a moving situation and can be used over considerable periods if supplemented by fresh bread, meat and, as available, eggs and fruit. The railhead company should be redesignated "Ration Supply Company" and should have forty-eight trucks as a part of its T/O&E. It is a mistake to

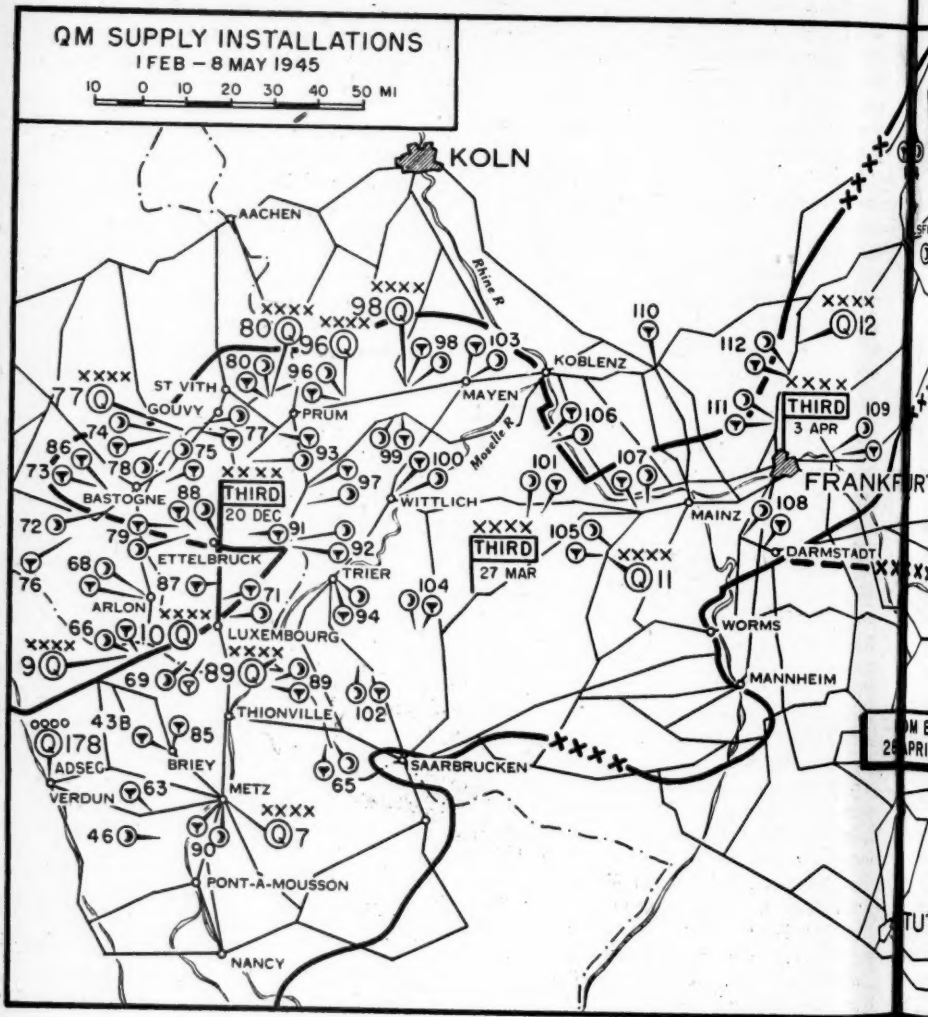
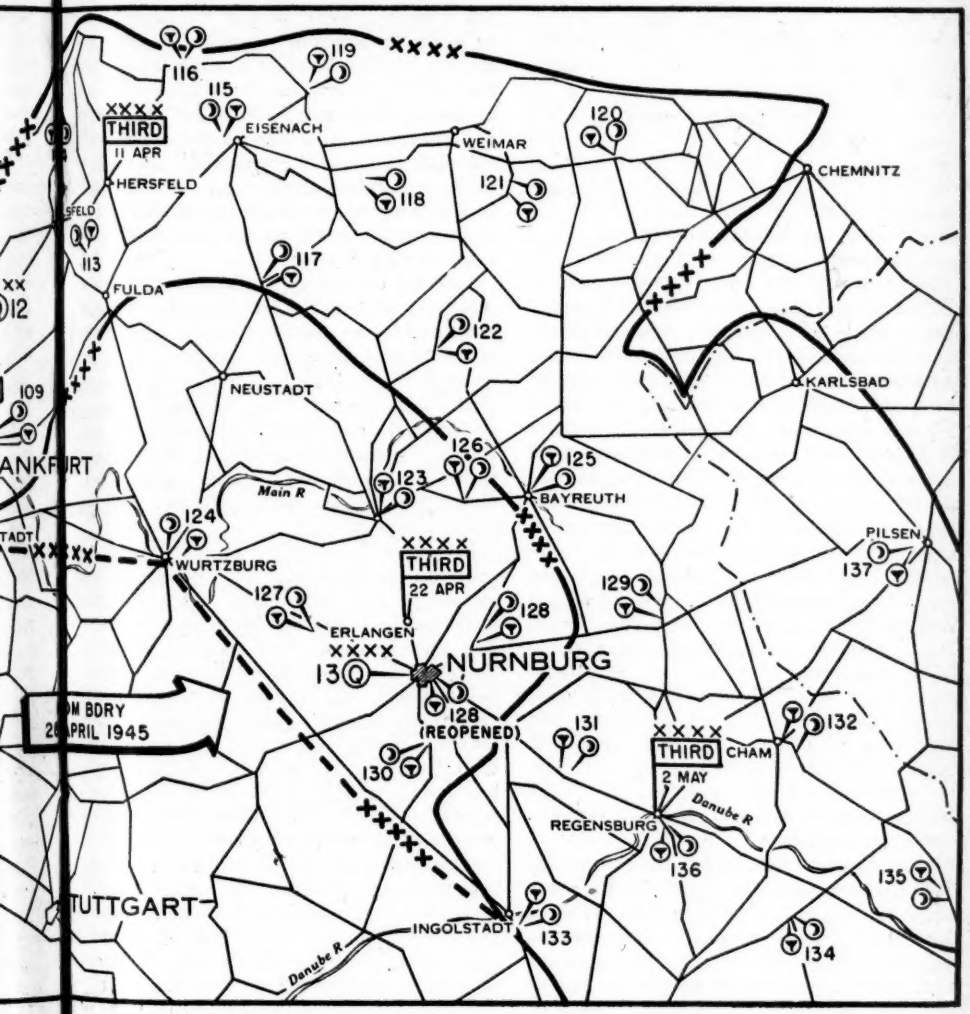

QM SUPPLY INSTALLATIONS
1 FEB – 8 MAY 1945
10 0 10 20 30 40 50 MI
KOLN
AACHEN
Rhine R
KOBLENZ
MAYEN
Moselle R
ST VITH
GOUVY
PRUM
BASTOGNE
THIRD
20 DEC
WITTLICH
ETTELBRUCK
TRIER
ARLON
LUXEMBOURG
THIRD
27 MAR
THIRD
3 APR
MAINZ
DARMSTADT
FRANKFURT
WORMS
MANNHEIM
THIONVILLE
SAARBRUCKEN
BRIEY
ADSEC
VERDUN
METZ
PONT-A-MOUSSON
NANCY

Figure 5.


116
119
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XXXX
THIRD
22 APR
PILSEN
137
WURTZBURG
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130
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THIRD
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2 MAY
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Danube R
REGENSBURG
136
135
INGOLSTADT
133
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Danube R

Figure 5.

imagine this organization as always located on an operating railway; this is the rare exception. The British type bakery equipment is highly mobile and highly satisfactory.

Gasoline: This is the big problem. A combination of package and bulk gasoline probably fits most situations. There are situations when packaged fuel is the only practicable system. The gasoline supply company should have forty-eight trucks as a part of its T/O&E. A part of the trucks capable of carrying 3,000 or more gallons of packaged gasoline would be advantageous. Tankers should hold at least 3,000 gallons. The gasoline company needs fifty more laborers.

Field Service Section: This section exercised general supervision over all Quartermaster troop units through group and battalion commanders. The section also controlled the labor pool, laundries, bath units, salvage units, and captured enemy matériel.

Troop units were organized into battalions on a functional rather than a geographical or area basis. A single group headquarters headed all battalions, although two would have been better. The functional organization proved the better plan; the battalion commander soon becomes a specialist and can render great assistance to the chief of section concerned; for example, all railhead companies were in one battalion, all gasoline supply companies in another, etc. No attachments were made to corps, G-4 truck companies excepted. Units, such as laundry and bath, used in support of corps were held under Army control for reasons of flexibility, but wide latitude was permitted the Corps Quartermaster in their actual allocation, location and employment.

Graves registration matters are best handled under a separate section. Collecting point teams were supplied by Army to divisions and corps as required. Units evacuated the dead from their own areas to the collecting points or direct to the cemetery, whichever was more convenient. Identification must in all possible cases be established at the collecting point. Searching parties composed of graves registration personnel and service units were employed in many instances, particularly in the Bastogne and Metz areas. All cemeteries were operated by Army; none by corps or divisions. In order to keep the number of cemeteries at a minimum, a new location was not chosen until the evacuation distance approximated 100 miles. The section worked closely with the Adjutant General's Casualty Section. The percentage of unidentified was extremely low due to the inexhaustible efforts of the section. A photograph in the service record would be of great assistance in identification.

Laundry units were employed by hospitals, salvage repair units and front-line troops. Bath units were employed almost exclusively in the forward areas. Each corps was allotted its share of available bath and laundry units. Bath units operated a clothing exchange system. Bath and laundry units were an outstanding deficiency. Salvage collection and repair units, although they performed splendidly, never had the capacity to cope with the entire problem.

Divisions—armored and infantry—have inadequate quartermaster facilities. It is the opinion of this writer and others that the divisional organization should include: Division Quartermaster and staff, a battalion headquarters, two standard truck companies, headquarters and service company, labor, ration breakdown, gasoline, guard, bath, laundry, graves registration and personal effects; recovery and repair section for clothing, shoes, textiles, field range and miscellaneous property. The duffle bay should be eliminated as a *normal* piece of field equipment for troops in forward areas. A clothing exchange system within the units operated in conjunction with the divisional laundry and repair units would save tremendous amounts of property and money. Divisions must have their own ration breakdown facilities. It is not feasible to make issues direct to using units except in a purely static situation.

Military Government in Occupied Germany

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For forms of government let fools contest; Whate'er is best administered is best. Pope, *Essay on Man* (ep. III, 1. 303).

EVERYBODY, from the first soldier who enters an enemy country up through the various military echelons including the theater commander, is personally concerned with the success of military government. Civil affairs control may take any form from a bayonet and the rash voice of the soldier in the street to the elaborate plans of the chief of the G-5 section in theater headquarters.

In order to administer any form of government in the most successful manner, the administrator must have full knowledge of the peculiarities of the people, their psychology, philosophy, economic point of view and culture, as well as the physical aspects of their country. The use of the term "success" envisages that both the governed and the governing be satisfied. Observation of the military government established by Germany in occupied areas has constantly illustrated the fact that while the governing may have been satisfied with the results, the governed were definitely not. We have, as concrete examples of this dissastisfaction of the governed, the underground activities, sabotage, and general hostility of the peoples of Denmark, France, and Greece toward Germany.

Experiences through the liberation of Italy, France, and Belgium have enabled us to learn certain lessons concerning both a form of government for territories and the *modus operandi* for the administration of that government. However, it is impossible to apply to a new area which differs in people and human values the same procedures previously applied to another people and their country. The basic differences of peoples, their willingness to cooperate, their friendliness, and a directed national policy must be taken into consideration.

Our entrance into and the occupation of Germany poses certain problems for the military government of that territory, and dissimilar to those of past experience. It therefore becomes necessary that the personnel to be used in administering the military government in occupied Germany be possessed of special qualifications other than academic proficiency in a form of military government.

History shows us that the formation of the German Reich through union of the several small Germanic states resulted in a variegated people with differing cultures, ambitions, religions, and perspectives. It is still evident that the people from the cities consider themselves superior to the farmers; the industrialists from the Ruhr regions have conflicting interests with the Bavarians; and the East Prussian wishes for himself and his posterity the imperialistic control of government and army.

The events show that Germany as a nation was not ready for self-government by democratic processes during and following the revolution of 1918. It is questionable whether she is prepared for this same responsibility today. It is questionable whether her people will thoroughly understand or desire such a form of government in the future. These are all matters which in some degree pose problems and offer difficulties for military government.

Administrators of military government in occupied Germany need, therefore, a thorough understanding of the historic background of these many internal, governmental, and social aspects of German life. A knowledge of the German language will be of major advantage to any administrator. If the Germans had understood the complex economic and political questions of internal France, Denmark, and Greece and had had an inclination toward humane treatment and a proper approach to these problems, their military governors might have met with success in administer-

ing the military government of these people. Accordingly our military affairs people in dealing with occupied Germany will do well to be possessed of this understanding of economic and political questions and demonstrate a faculty to be able to think, act, and react with an awareness of the German conception of everyday practical government.

The German mind, as stated above, is still deeply rooted in the archaic dogmas of old Germany which have further expression in those popularly supported national philosophies that have engendered such national songs as "Die Wacht am Rhein" and "Deutschland über Alles." They still stand as threats to foreign powers accomplishing convincing conversion of present-day Germans to democratic viewpoints in occupied areas.

It is well to remember that the individual German is well disciplined both in mind and behavior. That which we identify as arrogance on the part of his leaders, both military and civil, is accepted by him as proper, duly constituted, efficient authority. He has learned that only a strong central government provides any semblance of prosperity for him. While he is fond of and loyal to his local community, town or city, he nevertheless looks to the stalwart bulwark of positive control government as his guiding star. Strong bands of unity or oneness join him with Germans everywhere to the Vaterland.

These traits of German civilization are better characterized in the term "Deutsche Kultur." In attempting to understand German behavior, we have to appreciate mental processes as well. The word "culture" is not synonymous with "kultur" and the word "Gemütlichkeit" has no exact counterpart in our English language. These shades of meaning in the spoken word portray shades of mental processes not completely visible or conceivable to the American mind but offering a key to better understanding of the military governor by German citizenry. This understanding finds its basis in using German-speaking civil affairs officers and men so as to reduce or eliminate the use of German nationals as interpreters. In the past this has been one of the weak spots of our military government structure.

Let us consider some of the specific matters which require the attention of military government. We take the big picture item by item so as to gain a comprehensive view of our problems. Visualize the reaction of both the German citizen and the military government administrator in the following matters: devastated areas; mine clearance; police, prisons and crimes; politics; public health, medical supply, and welfare; education, the press, youth movements, universities and schools; displaced and repatriated persons; refugee movements, health and supply; utilities; public safety; public relations, press and radio; communications, postal, telephone and telegraph; agriculture; commerce, economics; transportation; fiscal matters, loans, currency circulation, black market, inflation, foreign and domestic banks; fuel; foreign trade; food; industry; construction; minerals; and the judiciary.

Some of these subjects are of pertinent interest to combat troops and their civil affairs officer. They increase in practical importance as they become chargeable to divisions, corps, and armies, but they are, in any event, of primary concern to the theater commander. Their regulation by remote control can be regarded as a function of our War and State Departments.

For the division or corps G-5 to restore sanitary conditions in his area or to regulate refugee movements or invoke curfew are matters which, to a certain extent, can be accomplished by an understanding of technique. When army areas are involved and grow to theater proportions, we then have a condition which calls for astute and judicious administration.

It has been common practice for any system of military government to use local native officials to the greatest extent possible consistent with security. Moving into hostile territory poses the question to what extent this procedure can be practiced. This is of equal concern to the front-line regiment or division and to the theater commander. The

operating personnel of the military government and its lower echelons rub shoulders with the populace, have intimate contact with their daily lives, must know the workings of their minds, and the shades of meaning of the spoken word as well as the gesture. We know that basically most people in Germany are either Roman Catholic or Lutheran. Military government personnel should know and understand the distinctions in the feelings of the persons concerned. Germans are accustomed to certain forms of speech and tones of voice. The more we can be self-sufficient as regards knowledge of language and Germanic psychology, the more effective will be our control and administration of the affairs of these people and their country.

Many an enemy has been, is, and will be respected; others are despised. The efficient administration of our military government in occupied Germany by all echelons will inevitably result in either respect or hatred. Our effectiveness will be in direct proportion to the degree with which we are respected. Again the matter rests solely on the human equation of victor and defeated. We may defeat Germany in battle, we may reduce her to military impotency, but until such time as our military government can establish firm and definite respect by her people we shall not have completed our war aims. Our war aims include the disarmament of Germany and a change in the political and philosophical concepts of its people. We must conduct our military government in such fashion that the German people completely realize that we are governors and they are the governed.

Selection of personnel for specific assignments has been emphasized in our army during this war. The elaborate systems of evaluation and testing of personal experiences and education constantly make available pertinent information on WD AGO Forms 20 (Soldier's Qualification Card) and 66-1 (Officer's Qualification Card) as a basis for choice of personnel in assignment. It matters little whether we think of military government in occupied Germany as being for the period during combat or whether in operation after hostilities cease; whether exercised by troop units in combat zones or organized on an area basis. The personnel actually assigned to these duties should be possessed of those qualifications which permit the relations with the German people which military government will require. The term "relations" as used in the preceding sentence is not meant to infer fraternization between our military personnel and the German people but rather that thorough appreciation of German psychology with which we must constantly deal and which in one form or another affects our program for military government. This situation has threatened some of the attempts of the military government in Germany thus far, particularly in those cases where it extended to the Germans actually killing some local officials our military government had retained in their positions.

In the past many of our selections have been based on previous political experience in the United States of the persons concerned. This alone is not sufficient. Spenser in his *Faerie Queene* (bk. V, canto II, st. 51) said, "Ill can he rule the great that cannot reach the small." We shall find that most of our contacts and relations in Germany will be with the "little" people—the farmer, the shopkeeper, the employee in industry. We cannot pamper or coddle the German people or their governmental officials with our military government; however, most of the major obstacles of organized resistance to our government are engendered by Nazi party officials and not by the average fellow in the street. The little fellow may have been a member of the Nazi party, even with enthusiasm, but, unorganized as he is with our military government in control, he will not be capable of any major obstructional tactics. Here again a thorough understanding of German history, German language and German psychology will stand our military government personnel in good stead.

Many of the subjects suggested above as food for thought can not be governed in their entirety by any form of military government which a theater commander can proclaim. It is well for those charged with military government to recognize that many of these ac-

tivities need be left for action at the peace table. They involve complex international relations and are of far-reaching political significance. The internal political readjustment, party alignments, boundaries, war claims or reparations, spheres of influence, and other matters of this magnitude involve activities and decisions which must be left for action by the delegates to the peace conference. Our allies have certain rights and privileges in these matters which must be respected. We may wisely leave such things to our own State Department and the United Nations Organization.

Signal Corps "Early Warning" Radar

DEVELOPMENT by the Signal Corps of an "early warning" radar so powerful that a squadron of bombers flying over Boston could be detected and tracked by a radar set operating in Philadelphia has been revealed by the War Department.

Early warning radar was developed originally in 1937 at the Signal Corps Radar Laboratory, Fort Monmouth, New Jersey. Early models were in use by Signal Aircraft Warning units overseas when the Japanese attacked Pearl Harbor in 1941, and it was one of these which picked up a warning of the attacking Jap planes while they were still 132 miles distant.

One variation of this basic radar design is a mobile trailer-mounted set, referred to in military terminology as Radio Set SCR-270. Another is Radio Set SCR-271, a huge fixed-station installation which included, as components of the "set," a good-sized building and a massive steel antenna tower ranging in height up to 400 feet. Several different models of this fixed-station set have been developed, varying in the type of building utilized, the height of the tower, or modifications of the antenna or the radar itself.

The SCR-270 radar, designed to be moved rapidly on its trailer from one location to another to keep abreast of advancing forces, can be readied for operation at a new site by skilled technicians in eight hours. It can "search" both the sky and the surface of the earth in a 360-degree circle, and will detect ships at sea, as well as planes.

Early development of these sets was based upon experiments conducted as early as 1936, when the first American-made radar was placed in operation by Signal Corps engineers. This first radar was a portable short-range set, and although development of the search radar began the following year, the longer range required for an early warning radar was not achieved until 1939.

As a result of these tests, production was rushed on two hand-made radars of the SCR-271 series, which were shipped to Panama in June of 1940 to form a new basis for th air defense of the strategic Canal Zone. A new kind of military unit, the 1st Signal Aircraft Warning Company (Panama), also proceeded to the Canal Zone to install the detectors and operate them.

On 8 October 1940, a commercial air liner was flying from Miami to Panama. On a hilltop overlooking the Caribbean approaches to the Panama Canal were troops of the untried Aircraft Warning unit. In the prefabricated building underneath the towering antenna, an operator turned dials and watched the fluctuating trace of an electron beam on the face of a cathode ray oscilloscope. At the extreme edge of the baseline, he saw the electronic trace rise until it formed a definite inverted "V." The airplane, 118 miles away, had revealed its presence by reflecting a pulse of radio energy sent out by the SCR-271.—*From a release by War Department Bureau of Public Relations Press Branch.*

Postwar Mountain Training

LIEUTENANT COLONEL ROBERT C. WORKS, *Infantry*
87th Mountain Infantry

The author is a graduate of the USMA, 1938. He was with the 87th Mountain Infantry from September 1942 until October 1943, serving with that unit in Kiska, Alaska, from July to October of 1943. From November 1943 until June 1944, Colonel Works was Senior Technical Adviser, Mountain Training Group, at the West Virginia Maneuver Area. During the period July 1944-February 1945, he was G-2 of the 10th Mountain Division. Three months of his assignment with the 10th Mountain Division, were in Italy, as were his assignments as Commanding Officer, 3d Battalion, 87th Mountain Infantry, February 1945 to June 1945, and thereafter as Regimental Executive Officer.—THE EDITOR.

THE campaigns in the Mediterranean Theater were fought in rugged, mountainous country. In Greece and Crete and in Tunisia, Sicily, and Italy, "the soft underbelly of Europe" consisted of jagged peaks, deep canyons, and natural solid-rock fortifications which, by comparison, made man-constructed barries seem like "logical avenues of approach." Most of the campaigns in the Pacific from Attu to Okinawa have been fought in equally precipitous terrain, and the attacks on the home islands of Japan would have been mountain combat from the landings on the beaches until the Marine photographers had reached the peak of Fujiyama. What has been done in the past and what can be done in the future to prepare our Army for mountain combat?

Growth of Mountain Training in our Army

Little attention was paid to mountain combat during the period between wars. Our training and maneuver areas were purposely located in flat or rolling country. Where mountains existed, they were avoided as being impassable. Yet our civilian army, generally untrained for mountain fighting, successfully completed in Italy the longest, bitterest mountain campaign in history.

On pre-war maneuvers in Hawaii and the Philippines, certain mountainous areas were not occupied because they were "impassable." Our battle maps showed areas in northeastern Luzon, where our divisions were fighting, as "unexplored." The Zambales mountains, through which the Japanese moved at will, were not "feasible avenues of approach to a large force," and were used to hinge the left flank of the Philippine Division on its annual maneuvers. Even Mount Mariveles on Bataan was not completely occupied during the maneuvers of 1939.

Indications that armies could live and fight a modern war in the mountains began appearing with the Italian invasion of Ethiopia, followed in rapid succession by the Spanish Civil War, and the invasions of Norway, Yugoslavia, Greece, and Crete. When the Japs landed at Lingayen Gulf, our mountain training program had just begun, too late to help those on Bataan, New Guinea, or Attu.

The 87th Mountain Infantry was organized in December 1941. At that time there was no precedent for training a mountain soldier. Instructors were either skilled civilian mountaineers or qualified army officers without mountain experience. Training the soldier to be a mountaineer, or the mountaineer to be a soldier, was a trial and error proposition which required the better part of two years.

This fumbling process was not made easier by the existent training literature. Foreign manuals were carefully studied, but their entire doctrine was impossible to apply to American soldiers training in American mountains. A minor point which illustrates the difficulties of using foreign training literature is the subject of shelter. European mountains are comparatively heavily populated, and European mountain troops assume that billets will always be available. Small forces on patrol might be required to

bivouac above timberline for short periods, using tentage; but generally they could depend on sheep herders' cabins or ski lodges. To bivouac battalions or divisions under canvas above timberline was considered impossible. Yet our mountains are almost unoccupied, and we had to develop our own technique and equipment for sheltering large bodies of troops. Finally the doctrine of mountain training crystallized in two Field Manuals: the revised *Operations in Snow and Extreme Cold* and *Mountain Operations*. These were not published until mountain-trained units were in combat.

Untold time and money were spent developing and testing skis, ski boots, and ski waxes; rock pitons and ice pitons; Manila hemp and nylon rope; a dozen oversnow vehicles, ending with the M-29 or Weasel; mountain clothes and mountain rations; and every article of clothing and equipment that a man carries on his back. European equipment developed for a particular mountain range in a damp temperate climate, could not be used by troops who might fight in Alaska, the Bontocs [the Philippines], or the Kuriles. Our equipment was developed by partly-trained mountain soldiers, who at first were not quite sure what they wanted. But as the mountaineer gained in experience, and his technical doctrine developed, his equipment improved until now we have the finest mountain equipment of any army in the world.

As the 87th Mountain Infantry expanded into the Mountain Training Center and later into the 10th Mountain Division, other experiments in mountain and cold weather training were carried out. In the spring of 1943, one regimental combat team of the 36th Division and the entire 45th Division trained under the Mountain Training Center in the Blue Ridge Mountains of Virginia. During the winters of 1943 and 1944, the 28th, 35th, 77th, and 95th Divisions trained to live and fight in the mountains in the West Virginia maneuver areas. The training in these maneuver areas followed a general pattern and included specialized, individual, and unit training.

Specialist schools in rock climbing, mountain medical evacuation, skiing, and mule packing began training an advance detail of picked men from each unit three weeks before the arrival of the unit in the maneuver area. Approximately ten men per company received this training under the expert instructors of the Mountain Training Group. In combat these men could be used as a team to accomplish some difficult mountain task. In training they were used to guide and instruct the other members of their unit.

This personnel, and the regularly assigned mountain technical advisers, supervised the individual and small-unit training of the company during the first week and a half in the maneuver area. During that period all men were taught elementary rock climbing, mountain marching, stream crossings, signaling, the use of rope, and bivouacking in rugged, cold country.

The last week and a half was spent in company, battalion, and regimental combat-team problems. These exercises were designed to test the application of the techniques learned during the earlier training. As these exercises were continuous, the supply problem was continuous, and became more difficult as the operations progressed. Many sound tactical plans failed because the commander had not coordinated the use of jeeps on the poor roads, the use of mules on trails, and the use of packboards where no trails existed. Other plans failed because they did not coordinate the trail-building, mountain-stream crossing, bridge-building, and rock climbing required in a canyon crossing. But all units learned the immense difficulties inherent in mountain operations and, most important, they learned that, by improvisation, planning, and determination, these difficulties can be overcome.

The wealth of mountain experience gained by individuals and units in the mountain maneuver areas of the United States only supplemented that learned in combat. Most of the mountain-trained troops in the Army today are combat-trained. In Italy the 3d, 34th, 36th, 85th, 88th, and 91st Divisions learned to fight in the mountains the hard

way on one of the war's toughest fronts. Two units in Italy, the 45th Division and the 10th Mountain Division, had received varying amounts of pre-battle mountain training, and their combat records and the words of their commanders testify to the value of learning before the bullets start to fly.

The bitter lessons in tactics which appear in combat reports were learned by trial and error. Mountain combat, from the ground up, had to be learned by each unit as it was committed for the first time. *Lessons from the Tunisian Campaign* states: "In order to advance successfully, troops had to avoid natural corridors of approach which were invariably mined and heavily defended, and work along ridges and high terrain features."

Supply is another totally different problem in the mountains, where three hot meals per day applies only to rear echelons. The most modern and primitive methods of transportation had to be devised during combat: air and back-packing. The 45th Division had carried overseas a few of the packboards with which it had trained in the States. From these models, other organizations had packboards constructed locally in the theater. Mules were another problem. Few of our motor-minded city-bred soldiers knew the fuel consumption, rated-load capacity, and first echelon maintenance of a jarhead, Alpini, M-1. Basket, squaw, or diamond hitches were not even part of the military vocabulary of a World War II soldier. And finally, Cub planes had to be impressed into the service of ration, water, and ammunition delivery to units beyond the reach of ground transport.

Equipment was initially inadequate. The high rate of trench foot can be laid to the lack of proper footgear and a lack of planning for a daily "sock exchange." Numerous casualties were suffered before troops were equipped with heavy woolen ski socks, shoepacks, sleeping bags, jackets with hoods, and sweaters. The old GI shoes and leggings, overcoats, and blankets were found wanting in a mountain war. But even the finest equipment can be misused by inexperienced troops, as was proved during the winter of 1944-45 by the still persisting trench foot, the prevention of which is a command function. Troops must be taught during training, before casualties really hurt, how to use the fine mountain and winter equipment they will be issued in combat.

The progress in training methods, technique, and equipment of mountain warfare made in our training areas and on the battlefield during nearly four years of costly hit-or-miss experimentation must not be lost to our Army during the years of peace.

The Value of Mountain Training for the Infantry Division

Mountain warfare includes specialized techniques, but principally it requires the ability to overcome obstacles. The soldier who has maneuvered in the Alleghenies or the Rockies is confident when he is confronted by the small man-made obstacles of the flatlands. The mountain-trained divisions of the Fifth Army which had scaled the sheer slopes of the Apennines did not hesitate when they reached the Po River. And if any of our future battles are fought on the plains or the beaches, troops such as these will fight with the assurance that no difficulties that they may encounter will equal those known in the Aleutians, in the Apennines, or on maneuvers in the Rockies.

Our troops should be trained in the mountains during training periods. The mountains should not be reserved for specialized, elite mountain troops, but must be a part of each infantry division's unit training, which should include combined maneuvers. The value to the unit is threefold.

First, maneuvers in rugged terrain with a limited or nonexistent road net more nearly approach battlefield realism. Where bullets or flags fail to halt the unnaturally-rapid movement on normal maneuvers, the difficulties of fighting the terrain and the difficulties of supply, control the action in a mountain field exercise. Commanders learn the importance of a sound supply plan which may include road building, jeep shuttles, mule-packing, back-packing, and even horizontal or vertical hauling lines across a canyon or up a cliff. Even when the umpiring breaks

down in the ammunition play, the commander must still provide his troops with rations and water which can often be a major supply problem in itself.

Second, the commander has an opportunity to judge his subordinates' ability to accomplish a difficult task. A regimental commander after crossing the Blackwater Canyon in the West Virginia Maneuver area stated that he was then able to correctly judge his officers' capacity in accomplishing the impossible. Junior leaders had also tested their men under combat conditions and could replace those platoon or squad leaders who were found wanting. This unit did not have to wait until combat to get rid of its dead wood.

Third, the individual soldier had learned to fight as a doughboy. He learned that the infantryman is not the streamlined, modernized, truck-riding soldier that the news magazines picture, but that even today the foot soldier must often pack his weapon, his ammunition, his rations and his bedding, just as Stonewall Jackson's foot cavalry did eighty years ago. He learned to pack and lead a mule, sleep in the snow, and control his fear as he clung to a rock face three hundred feet above the valley floor. He learned to use rope —a rapidly disappearing art in our Army. He learned to pack seventy-five pounds of ammunition on a pack board and to tote it over the mountains. These and a thousand other techniques of mountain fighting he learned, but principally he was hardened physically and mentally.

The back-breaking efforts of a mountain operation develop the body as no system of calisthenics or group games will. Movement from the bivouac to the mess line is an exertion. Legs, arms, and chest are further developed in rock and ice climbing. But in all physical conditioning, the accompanying mental hardening is the vital factor.

The mountain-trained soldier has mastered new and strenuous physical accomplishments. He has overcome his inherent fear of high places. He has tramped over rough country, twenty to twenty-five miles in a day, with a 4,000 vertical foot change in elevation. He has slept in sub-zero temperatures and knows how to stay alive in a blizzard. Weeks on a transport and in a staging area, and months in a wet foxhole will soften him physically, but he will remain mentally hard and sure of himself. The mountain training given to a handful of our infantry divisions just before they went overseas should be included in the peacetime training of our entire postwar Army.

The Value of Specially-Trained Mountain Divisions

To perpetuate the skills of the highly specialized mountaineering that was taught to our Army by civilians after the war began, at least one mountain division should be retained in the peacetime Army.

Nearly all countries which we may be called upon to fight have rugged, mountainous terrain. During both world wars when the fighting on the plains became stabilized, the armies moved units into the mountains. These units succeeded or failed, depending on their ability to live and fight in broken terrain.

In the recent war where a dozen specially-trained mountain divisions could have been used profitably in Italy, only one was available during the last few months of the campaign. This mountain division was able to accomplish with more ease the difficult missions that other divisions had been doing the hard way during almost two years of mountain fighting.

During its four months of combat the action of the 10th Mountain Division cannot be considered a complete test of a specialized mountain unit. However, enough was learned of its capabilities to justify the retention of a mountain division in the Army.

The nature of the army group mission, during the winter months of 1945 in Italy, prohibited a large scale oversnow operation. But numerous patrols using skis and ice-climbing equipment were sent out against an enemy which was only able to move on the plowed roads and trails. During the month that the deep snow lasted, no enemy patrols were able to penetrate friendly lines, yet ours

moved at will in No Man's Land. These troops were also trained to operate oversnow vehicles and they maintained outposts on the highest snow-covered ridges.

The first offensive operation of the 10th Mountain Division was the attack of the Campiano Ridge. This precipitous mountain was seized by trained rock climbers scaling sheer cliffs. Climbing this ridge was possible only for specialized mountaineers. Its seizure gained observation of enemy positions, denied enemy observation of our positions, and secured the Division left flank in the succeeding offensive on Mount Belvedere.

Later operations of this division were similar to those of other divisions in Italy since 1943, except that, trained and equipped for rough country, it could accomplish the job more readily. When the 10th hit the billiard-table-flat Po Valley it left its animals behind, and without hesitation picked up its motor transportation and began the pursuit to the river. As the first unit across the Po, the 10th Mountain Division raced on to the foothills of the Alps along Lake Garda, and when the war ended, it had already begun the difficult push through the Alps.

If in a future war there is no demand for mountain-trained troops, the mountain division can instantly and effectively be used as a standard infantry division, a policy often practiced by the Germans. But the continued training of a mountain division during time of peace to develop new technique and tactics, and to provide a cadre for rapid expansion in case of war, will be cheap insurance against sending untrained men to fight in the mountains.

Postwar Organization

Postwar mountain-trained units should be included in our peacetime organization and become a permanent part of our Army. Mountain units in the Army should include at least one mountain infantry division and several separate mountain infantry battalions. All infantry divisions should receive at least one month of mountain training each year or in each two-year period, depending on the length of the enlistment period.

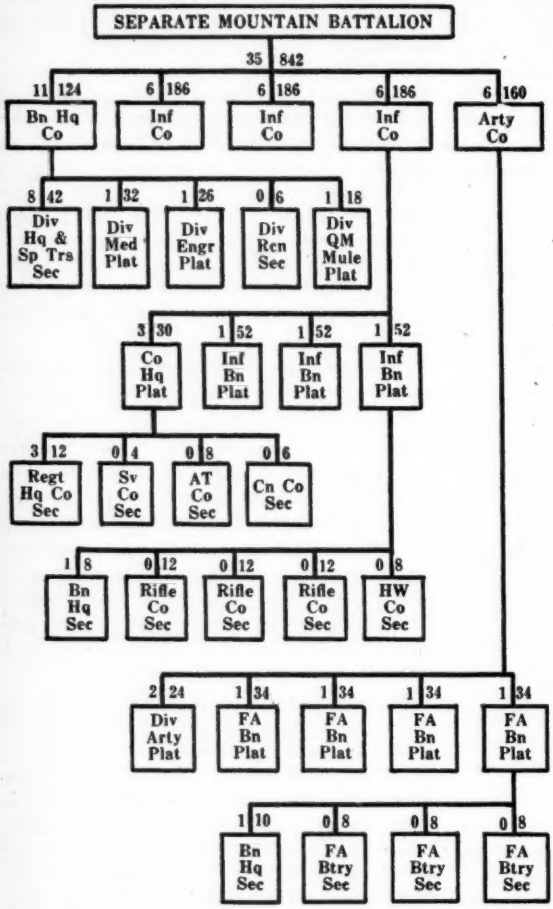
1. The Mountain Infantry Division.—The mountain infantry division should be organized under a standard infantry table of organization. This T/O, however, must be flexible enough to allow modifications when the unit operates in Alpine terrain, or low mountain terrain without roads. The addition of at least three mule pack companies and the substitution of mules for trucks will be required in low mountains. The substitution of oversnow vehicles and toboggans for mules will be required in Alpine terrain. In the summer in mountains similar to those in Italy the standard organization and equipment of an infantry division is the most satisfactory. The one point which all units have learned in this war is that T/O's and T/E's are a handy guide, but must be modified to fit a certain terrain or a particular situation.

Because of the time required to train mountaineers, the conscripted personnel of the division should be selected on the basis of their civilian experience. Civilian skiers, mountain climbers, and those conscripts from the northern mountain states will fit in more readily in a high mountain unit. Experience has shown that officers and men reared in states with terrain and climate similar to Idaho, Minnesota, and Maine adapt themselves more rapidly to the severe weather and high altitude in which mountain troops must train.

The mountain infantry division should train under the most difficult conditions of terrain, climate, and altitude, preferably in the Rocky Mountains. It must, however, have some training in the low mountains of the Coast Range or the Alleghenies. And finally it must maneuver on the flats against standard infantry divisions, for all mountain units in combat will eventually fight their way out of the hills and into the valleys, where they must be able to adapt themselves to the faster-moving mechanized warfare of the plains.

2. Separate Mountain Infantry Battalions.—Separate mountain infantry battalions should be organized to provide a unit capable

of performing the highly specialized tasks of Alpine combat. These units should be attached to each standard infantry division operating in the mountains. All members of the battalion will be highly proficient mountaineers capable of operating in deep snow, on high rocks, and over glaciers. The battalion will provide the experts required by an infantry division which has received a minimum period of mountain training.


SEPARATE MOUNTAIN BATTALION
35 842
11 124 Bn Hq Co
6 186 Inf Co
6 186 Inf Co
6 186 Inf Co
6 160 Arty Co
8 42 Div Hq & Sp Trs Sec
1 32 Div Med Plat
1 26 Div Engr Plat
0 6 Div Recn Sec
1 18 Div QM Mule Plat
3 30 Co Hq Plat
1 52 Inf Bn Plat
1 52 Inf Bn Plat
1 52 Inf Bn Plat
3 12 Regt Hq Co Sec
0 4 Sv Co Sec
0 8 AT Co Sec
0 6 Cn Co Sec
1 8 Bn Hq Sec
0 12 Rifle Co Sec
0 12 Rifle Co Sec
0 12 Rifle Co Sec
0 8 HW Co Sec
2 24 Div Arty Plat
1 34 FA Bn Plat
1 34 FA Bn Plat
1 34 FA Bn Plat
1 34 FA Bn Plat
1 10 Bn Hq Sec
0 8 FA Btry Sec
0 8 FA Btry Sec
0 8 FA Btry Sec

This battalion may be used as a unit on skis for long range oversnow reconnaissance. It can be used as flank security on the higher snow-capped peaks while the division moves through the low mountains. The battalion can provide ski patrols, establish outposts and observation posts on high pinnacles, guide troops over rough country by picking the easiest routes, train replacements in elementary mountain combat, and install fixed ropes and hauling lines up cliffs and across canyons for the less experienced men.

During peacetime, the primary mission of this battalion will be the mountain training of infantry divisions. The battalion will be organized to fit the existent infantry division T/O so that it may be broken down and attached to the subordinate units of the division, providing a small group of trained instructors for each company.

These battalions should consist of Regular Army enlisted men, highly trained in their specialties. They will be basically infantry with a working knowledge of the particular branch they are to instruct. The problems of moving a pack howitzer across a canyon are little different from those of moving an infantry jeep up a cliff.

As this battalion has a dual mission: (1) training infantry divisions for mountain warfare, and (2) fighting as an infantry battalion in the high mountains, the organization must dovetail with the infantry division T/O and still be workable in combat.

The total strength of this battalion should be figured on the basis of assigning eight to twelve enlisted men to each company of an infantry division. This will total thirty-five officers and 842 enlisted men, roughly the

size of a standard infantry battalion. During combat or on maneuvers the enlisted men attached to the company could be used by the company commander as a group, or could be further attached to platoons. The officer and forty enlisted men of the infantry mountain battalion platoon could be used by the battalion commander as a maneuvering force, or he can attach the squads to his companies. Similar use may be made of the companies and the battalion by the regimental or division commander.

During the mountain-training period of the infantry division, the mountain battalion headquarters, under AGF directives, can supervise the specialized, individual, and small-unit training. It should also write the problems and direct the mountain maneuvers of the division.

Such a battalion will fulfill the division commander's combat requirements when he must fight his division in high mountains, and it will fulfill his training requirements when he must teach his division to fight in rough country.

3. Mountain Training for all Infantry Divisions.—The need of mountain training for all infantry divisions prior to combat has been proved throughout the war. To fulfill that need, a number of mountain-training areas should be set up after the war following the pattern of the West Virginia maneuver area. Each division in the Army should be given mountain training during each conscription period. Three weeks before the arrival of the division in the maneuver area, picked men can be sent to specialist schools in rock climbing, skiing, mule packing, ice climbing, or medical evacuation. The division will spend two weeks on individual and small-unit training and two weeks on maneuvers instructed by their own trained specialists and by the separate mountain infantry battalion in charge of the maneuver area. By using the skills and technical knowledge of this trained personnel, the infantry division can leave the mountains, thoroughly familiar with the problems of mountain warfare and with confidence in its ability to live and fight in any terrain.

With an organized mountain division and separate mountain battalions, and with a program for training all infantry divisions in mountain combat, the specialized skills, tactical knowledge, and training doctrine so laboriously acquired during the war will be retained for a possible future war. New techniques and doctrines will be developed. The men will learn military skills which will be practiced as civilian sports after discharge, thus providing a pool of trained, physically-fit replacements. And finally, trained men will be ready to cadre new divisions and battalions, if our country must fight another war in the mountains.

I want to pass on to you the most important military lesson I learned in the Infantry. It is this: don't wait for a goot target. You are likely to get hurt before you see one. When you are on the receiving end of small-arms fire, turn everything you have on the places where you think the fire is coming from. It will work out to advantage, whether you are stationary or are advancing. The only condition is that there must be a good ammunition supply line.

—Hon. Robert P. Patterson, Secretary of War,
in *The Infantry Journal*

Infantry Communication on Leyte

LESSONS gained during one campaign cannot always be applied in detail to a succeeding campaign; however, battle knowledge can always be adapted to work in with future operations to a great degree. Sometimes these may involve unorthodox short cuts, or using non-TB/A items, and more likely than not, never found in a manual.

Wire.—As was the case on Leyte, wire communication was constantly reliable mainly because the division wire team was attached to our regimental headquarters, and at least three lines were maintained throughout the operation to division. The primary benefit from this attached wire team are first, they are on hand immediately to trouble-shoot wire lines, and second, they are able to remain abreast of the operation which they must known in order to facilitate any moves forward.

Only in cases of extreme emergency were wire teams dispatched from regiment down during the night, as units were so close contact could readily be had by SCR 300 radio, and then you know the rule of movement during hours of darkness. It was necessary to install a TC-4 (40-drop switchboard) which is not authorized.

Our switchboard operator was so busy the wire chief or his representative had to remain at the switchboard at all times to keep message center informed of availability of wire and to care for incoming lines and work the terminal strip.

If possible, switchboard operators should not be required to operate more than three hours, as the nervous strain is tremendous.

Radio.—Our division policy was to maintain twenty-four hour contact with hourly call-ups; however, the radio dynamotor created so much noise we eliminated the hourly call-ups, and remained on "stand-by" as long as wire was working. SCR's 300 worked wonders to battalions and companies. Unit commanding officers say the 300 is the best radio they have had.

An added attraction was the SCR 193 mounted in a jeep, which was ideal for rough terrain. This mounting allowed complete maneuverability of our division net radio, which ordinarily would not have been possible with the usual mounting on a ¾-ton C&R.

A field telephone was kept with the radio car so the radio operator and message center personnel would not have to move about during the night. Remote control RM-29 was never used.

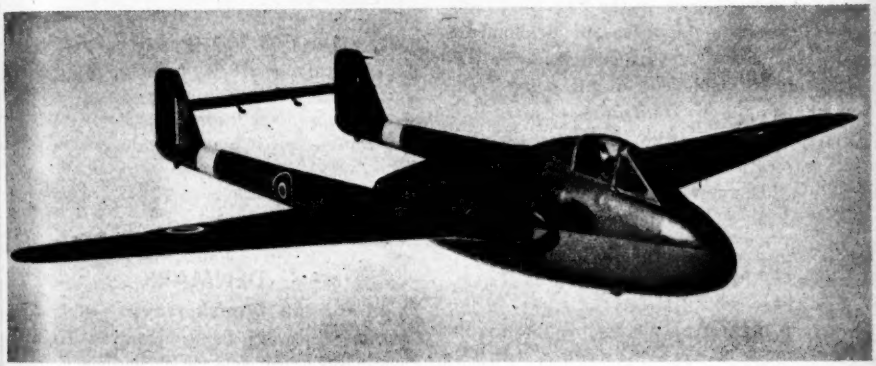
Message center.—Our message center proved quite a busy and important installation, and as a twenty-four hour service was necessary we found that a blackout tent was needed; however, we usually sufficed with a tarpaulin. We had very few runs to battalions as the necessity was not urgent. Usually messages were cleared by wire or radio, and any communications were usually picked up by the respective battalion S-4 and sent up with food parties.

General comments.—In cases of long periods of combat, men in the battalions who showed signs of weakening were brought back and replaced for about forty-eight hours of rest in the rear. This system was used to advantage.

Either myself or the communications chief was available at all times. We found it advantageous to work twelve-hour shifts.—*Lieutenant William M. Byrd, formerly Regimental Communications Officer, 21st Infantry, 24th Division.*

MILITARY NOTES AROUND THE WORLD

GREAT BRITAIN



The "Vampire":

The "Vampire" is believed to be the fastest jet-propelled plane in production in the world today. It was the first in Great Britain or America to exceed by a handsome margin 500 miles per hour in level flight, which it did in the spring of 1944.

The aircraft is of all-metal construction except the cockpit, which is of all-wood carapace construction. A pressurized cockpit has been designed for very high flying. The prototype first flew on 20 September 1943 at Hatfield.

The Vampire has an operational ceiling between 45,000 and 50,000 feet, and a really useful interceptor endurance.

The Goblin engine with which it is powered was the first jet-turbine aero engine to complete the official type-approval test, which it did in January 1945. It is the most powerful jet engine in full production in Great Britain up to the present time.

(*The Sphere*, Great Britain)

Wave-Breaker:

The "Admiralty Pneumatic Wave-Controller," was the largest individual device ever produced by the rubber industry anywhere in the world.

A number of these units set in line for wave-control will reduce a six-foot wave to approximately one foot. Each unit consists of a pneumatic ponton weighing nearly eleven tons. The multiplied heavy rubberized-cotton deck of the ponton is made up into four capacity chambers of 7,000 cubic feet each.

Each of these four chambers must maintain its individual pressure for at least seven days. The outer chamber has a pressure of

one pound; the second, two pounds; the third, three pounds; and the fourth, four pounds. The whole unit is 200 feet long and 25 feet high. It is clamped with 500 bolts and channel irons to a 700-ton concrete keel, with anchorage to the sea bed at the ends.

When a number of these units are set in line broadside, the waves strike the outer chambers, which may ride the punch. If however, the wave is extremely heavy, the pressure is transmitted to the second, third, or fourth chambers, which, with the pendulum action of the 700-ton concrete keel, will reduce a six-foot wave to approximately one foot.

(*The Sphere*, Great Britain)

British Proximity Fuze:

The shell that beat the flying bomb and saved the British fleets in the Far East from serious loss from Japanese suicide bombers had a tiny radio set—transmitter, receiver, and aerial all combined—in the nose of the shell. This radio proximity fuze ensures that if the shell passes within a certain distance of an aircraft the shell will explode. The story of this remarkable device was until recently a closely guarded secret. The original conception was British, and the earliest researches were carried out in Government experimental establishments in the United Kingdom. Our ideas were freely passed to the United States in 1940. It can now be stated that the sudden startling increase in efficiency of shooting down the flying bombs in 1944 was almost entirely due to the use of these fuzes.

(*The Times Weekly Edition*, London)

NETHERLANDS

Longest Bailey Bridge:

A 2,600-foot Bailey bridge across the Ijssel River at Zwoole—the longest span of its kind in the world—has just been completed. The span has been named the "Maple Leaf Bridge" in honor of the Royal Canadian Engineers who supervised its construction. The bridge is a temporary replacement for the railway and highway bridges.

(*Netherlands News*)

DENMARK

Ships for the Danish Navy:

Four ships are being acquired from the Royal Navy, the first of them, HM Corvette *Geranium*, having already reached Copenhagen. She has been renamed *Thetis*. Two frigates of the "River" type, which were previously lent to the Royal Canadian Navy, HMS *Annan* and *Monnow*, are to follow. Their respective Danish names will be *Niels Ebbesen* and *Holger Danske*. A corvette of the "Castle" class, which has still to be selected, will be renamed *Triton*.

(*The Navy*, Great Britain)

JAPAN

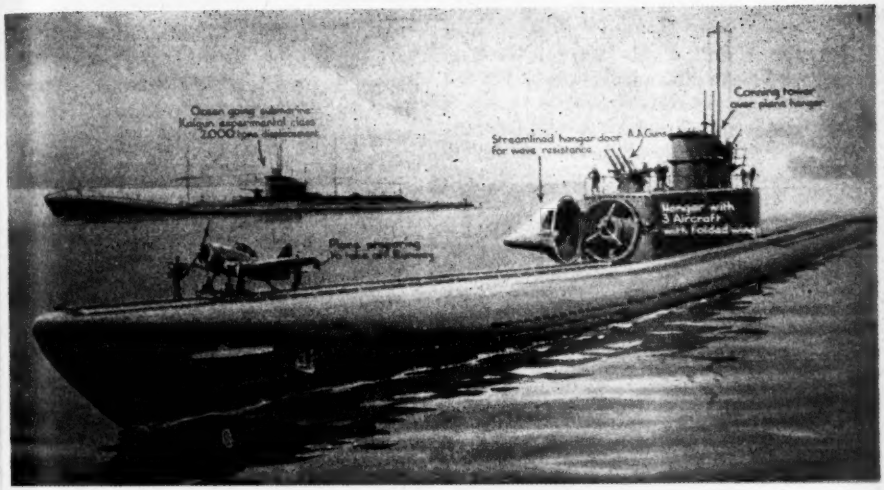
Air Raid Casualties:

Allied air raids on Japan killed 241,309 and wounded 313,041, according to the Domei Agency. Domei reported that the 554,350 casualty total was announced at a Diet session.

Metropolitan Tokyo, fire-bombed repeatedly by B-29's, headed the casualty list with 88,250 killed, 61,306 wounded, and 2,578,000 homeless. Atom-bombed Hiroshima was second: 49,221 dead, 58,839 wounded, 359,000 homeless. Nagasaki, second atom-bombing target, lost 21,501 killed, 51,580 wounded, with 204,960 homeless.

(From a news release)

Japan's Great Submarine:


Ocean going submarine
Katsuo experimental class
2,000 tons displacement
Streamlined hangar door for wave resistance
A.A.Guns
Conning tower over plane hanger
Hangar with 3 Aircraft with folded wings

Japan had a fairly large number of ocean-going submarines, and was adding rapidly to them at the time of surrender. One, of exceptionally large size, was built specially to carry and operate aircraft: the manner in which the aircraft were housed is an interesting construction. The hangar, capable of housing three planes with wings folded, is situated on the deck, and is watertight, so that the planes remain dry when the vessel is submerged. The door at the fore end of the hangar is, of course, watertight, and in form not unlike the door of a modern deposite vault. It is curiously shaped like a dunce's cap; and streamlined to reduce resistance. A runway extends from the door to the bows of the ship. This submarine, probably the largest in the world, had a displacement of more than 3,000 tons and was some 400 feet in length. She was surrendered to the Allies intact.

(*The Sphere*, Great Britain)

Japanese Type "O" Machine Gun:

The latest Japanese development in machine guns, the Type "O," combines the features of extreme simplicity and sturdiness with light weight, extreme flexibility, simplified barrel removal, and improved gas action. Add to these features the fact that the gun is precision-manufactured and handles the efficient Jap 7.7-mm (.303) rimless cartridge and you have a gun which rates second to none in its class in the entire field of such weapons.

To head-space this gun or to change the barrel—both of which jobs are, frankly, major operations in our own machine guns (requiring considerable time and removal of several operating assemblies)—it is necessary only to depress the spring catch on top of the receiver and unscrew the barrel collar. This collar can be used to regulate head space; and, by completely unscrewing it, the barrel is freed to be pulled out without removing any parts or assemblies.

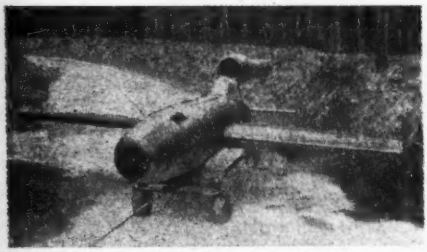
Incidentally, the gun with its tripod now weighs several pounds less than our own Browning caliber .30 machine gun, has fewer parts, and can be stripped more quickly in the field.

(*The American Rifleman*)

GERMANY

The Piloted Flying Bomb, V-4:

The V-4 is still another secret German weapon which the Nazis had in store for us. The picture above was taken at a well-camouflaged site at Tramm, near Danneberg. The V-4 resembles the V-1, famous flying



bomb launched against London and Southern England, but it is larger: it was built to be flown by a pilot closed in a hooded cockpit, seen at the rear under the jet air-intake. The bomb was to have been guided to a vulnerable spot, and then the pilot would bail out after having directed the missile on to his target. This specimen was found nearly intact at Tramm.

(*The Sphere*, Great Britain)

V-2 Experiments:

The first V-2 rocket-bombs launched by British experts recently streaked into the air from Cuxhaven, in Germany, aimed at a target area 150 miles out in the North Sea. One of them fell within three miles of the target point. These launchings followed intensive research and preparation based on such parts of V-2 weapons as were available after the collapse of Germany, together with statements of German rocket technicians on the methods they employed. No launching site was available, and Royal Engineers constructed one in six weeks, with large buildings for the testing and assembling of the rockets. The work was carried out by scientific experts and technicians from the Ministry of Supply. These V-2's incorporated improvements designed by the British, and their launching was greatly assisted by newly-designed guiding devices. They are said to be the first launched since the last of more than a thousand hit Southern England.

(*The Illustrated London News*)

"Catapult Seats" for Pilots:

The Germans, in the closing months of the war, perfected a "catapult seat" in which a pilot could be "exploded" out of a high-speed plane when he needed to bail out.

Perfection of the device grew out of wind tunnel tests in which the Nazis learned that the human body could withstand bailing out at speeds up to 535 miles an hour.

Since it is extremely difficult to get out of a plane at 500 miles an hour without propulsion of some kind, the German-developed seat was actually "exploded" through the roof of jet-propelled fighters by a powder charge activated by pressing a button.

The Nazis had made use of the catapult seat for about a year in their jet-propelled craft, and of twenty men who had to bail out at more than 500 miles an hour, two were killed.

(From a news release)

Zeppelin:

The *Graf Zeppelin*, Germany's one and only aircraft carrier, was found by the Russians at Danzig. The carrier was never completed, and what the Russians intend to do with it is not known.

(*The Aeroplane*, Great Britain)

UNITED STATES

MK 2 *New Life Vest:*

The Bureau of Aeronautics has procured a new life vest for flying personnel, called the MK 2, which has almost double the buoyancy of the present Mae West and has many new features not found in the AN-V-18 vest now generally issued.

It is designed for a minimum buoyancy of thirty pounds as compared to seventeen pounds for the older model. The design of the neck portion of the vest is patterned to eliminate chafing when worn deflated. When inflated, the wearer's chin and back of the head are supported by the neck portion of the vest.

In addition, the inflated vest suspends the wearer in the water in the more comfortable vertical position. The MK 2 is made of neoprene-coated nylon, the same as the new continuous-wear exposure suit. It is provided with nylon harness webbing and is equipped with a CO_2 inflation system, an oral inflation system and pockets and tabs.

The vest is made with three separate inflatable compartments, not interconnected. Inside and outside compartments are inflated by carbon dioxide and the inner one orally through the oral inflation valve connector. Deflation of the two outer compartments can be made only by removing caps from the CO_2 inflation holders. The air compartment can be deflated through the inflation valve.

The test vest has a buoyancy of thirty pounds with both the CO_2 compartments filled or the same with only the air compartment blown up. One CO_2 section will give twenty pounds.

The life vest has a hoist strap incorporated, strong enough to support the weight of the wearer out of the water. Two tabs for dye markers are attached on front of each side of the vest for marker or shark chaser. A loop on the upper right holds the one-cell life-preserver light prior to its use. The upper left lobe has a loop for the light after inflation. It holds the light upright for maximum visibility.

The oral inflation connector is held by a loop on the left side. To operate, the mouthpiece is unscrewed fully, then pressed down to open the valve so air can be blown in. Release of pressure closes the valve and holds the air in and the mouthpiece can be screwed down for positive blocking.

Two pockets on each lobe hold the MK 13, Mod O distress day and night signals, star flares, smoke signals, whistle, and other survival gear.

(From a news release)

Dummy Tank:

In the four photos is a rubber dummy tank, designed by the British and made in the United States. It may be used in the field to simulate tank positions.

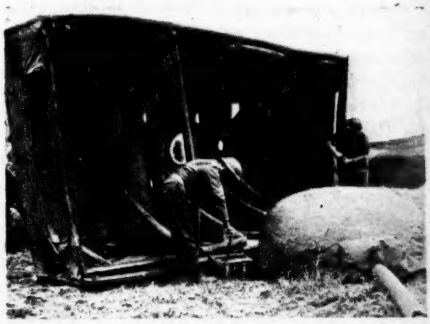


Figure 1.

The total time required for assembly is twenty minutes. In Figure 1 the body assembly is being laid out.

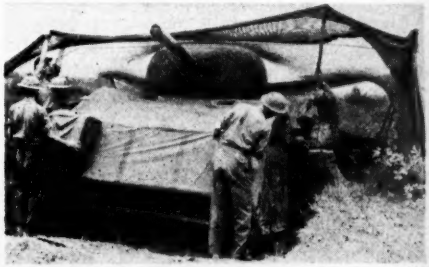


Figure 2.

Figure 2 shows the turret assembly being inflated with the forge pump. In the background can be seen the fully-inflated body assembly resting on its side and showing the air-tube supporting framework.

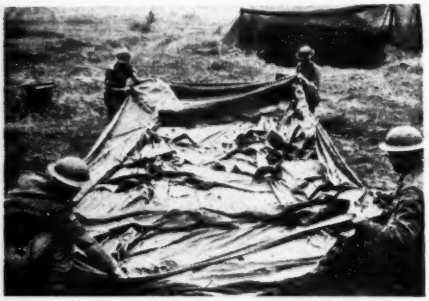


Figure 3.

Figure 3 is a general view of soldiers placing the completely assembled dummy into a camouflaged position formerly occupied by a medium tank which has moved up to attack.

Figure 4.

Figure 4 represents a comparison between the U.S. Army medium tank, M4 and the slightly smaller assembled dummy tank.

(From a news release)

Water Plant:

A stationary unit capable of purifying 72,000 gallons of water a day can be shipped, knocked down, in eight large crates that fit into one-half of a box car. Widely used to furnish our troops with drinking water, both at home and in the Pacific area, each unit is the equivalent of the average small-town municipal water works.

The Army unit can be set up, by unskilled labor, in two days.

The unit requires five gasoline-driven pumps. Two "low lift" pumps pick up the water from the source, while two "high lift" pumps force it from the filter to the distribution system. A high-capacity pump backwashes the filter to remove the dirt taken from the water.

The plant has controllers, regulators, and indicators to show the volume of water, amount of chemicals added, and other features which make it practically foolproof.

(*Science News Letter*)

New Electronic Devices:

Rubber lifeboats are now equipped with a radar device designed to lead searching aircraft to the rescue, according to the Air Technical Service Command.

Known as the "corner reflector," and weighing slightly over a pound, it enables lifeboats, carried on all AAF over-seas missions, to be easily detected. Originally developed for the Navy by the National Defense Research Committee, the screen-like corner reflector was tested for AAF use in the Electronic Subdivision at Wright Field and was procured in large quantities for operational use during the war.

Details of a high altitude communications system to keep pilots and crew members of strato-flying planes in radio contact with ground stations and other aircraft have also been announced.

This radio communications equipment, standard but highly secret for almost two years in the B-29's operating against Japan, features automatic tuning with push-button control through eleven different channels. It operates at altitudes from 25,000 to 40,000 feet, where former sets proved ineffective.

(*Army and Navy Journal*)

FOREIGN MILITARY DIGESTS

Operations of the 6th Brazilian Combat Team in Italy

Translated and digested at the Command and General Staff School from an article in Portuguese by Lieutenant Colonel José P. de Ulhôa Cintra, Brazilian Expeditionary Force, in "A Defesa Nacional" (Brazil) June 1945.

The Terrain

THE area with which we must acquaint ourselves in order to understand the early action in which the FEB (*Força Expedicionaria Brasileira*—Brazilian Expeditionary Force) took part is situated near the Tyrrhenian Sea, north of the Arno River, whose course formed the line of departure for offensive operations launched by the Fifth Army during the autumn of 1944. The terrain in which the FEB went into action lies between the coastal plains and the Serchio valley, on the western slopes of the Apennine range. Along the roads and particularly those in the plains, the area is densely populated. Along the two excellent roads which traverse the Serchio barricades, the city of Barga is located.

The roads are, generally speaking, well paved. Massive destruction practiced by the Germans, however, made all movements extremely difficult. This destruction seriously affected the entire campaign. Of equal importance was the use of mines, carefully placed along the roads.

The terrain, in certain areas intensely cultivated, on the whole has no dense vegetation. Occasional olive groves and pine trees resemble the eucalyptus groves in Brazil. The frequent rains of September and October made movement difficult; the rivers overflowed, flooding the roads which parallel their course. In addition, at that time of the year, paths and trails were practically useless, not only because of the heavy rains, but also because of bad drainage. In this mountainous area, all movements had to be made along the roads.

A subtle and well-trained enemy, forced to abandon the natural barrier of the Arno, would not fail to conveniently execute the maneuver naturally dictated by the terrain:

(a) Delaying action along the axis of movement together with extensive demolitions.

(b) Resistance, with no thought of retreat, in the almost inaccessible heights.

At the Pescaglia parallel, any large scale movements will have to cease. The mountains north of this line are easily defended and offer the attacker no accessible objectives for early exploitation. Here is revealed in all its fullness the "tyranny of the terrain": the strips of coastal terrain and the Serchio valley were the only openings for advance to the north. The mountainous zone became completely passive.

The enemy, who also felt the isolating effects of the mountains, tried to overcome it by constructing a road between the seacoast and the city of Castelnuovo di Garfagnana (over the highway from Montaltissimo to Garfagnana, between Colle Parazzeto and Compaccio). This made it possible for him to take advantage of the excellent position on Montaltissimo, which entirely dominates the seacoast. The ease with which reserves

could be moved also helped to strengthen his position in Garfagnana.

Participating Forces

The Enemy.—Immediately after abandoning the defensive positions on the Arno River, the enemy began his delaying actions along the north axis, demolishing things as he retreated. Our knowledge of the enemy's situation was very imprecise when we entered the line on 15 September 1944. Our only information about the enemy came from Italian civilians, organized in small combat groups under the name of *Partigiani* (Partisans).

The information we obtained can be outlined as follows:

1. North of Pisa, elements of the 16th SS Division (German) were operating;

2. Enemy patrols were seen in the region of Compignano and small groups were seen between the 80th and 84th parallels;

3. Enemy elements were situated north of Lake Massaciuccoli; and

4. Enemy artillery fire had fallen in the region of Pisa and Migliano.

On 20 September, the first prisoners captured indicated the presence of units of the 25th Infantry Regiment (42d Division) within our zone of action and this information forced us to admit the possibility of strong prepared positions along what was known as the Gothic Line.

On the 22d we identified elements of the 40th Infantry Regiment (42d Division) in our front, which supported the hypothesis previously stated. The movement progressed, and on 24 September new prisoners declared that on the night of the 24th and 25th, another retreat would be made. Our suppositions, therefore, proved to be wrong.

On the 28th the situation was further clarified:

1. The 2d Battalion, 25th Infantry, had already retired to the region of Castelnuovo;

2. The 1st Battalion, 25th Infantry, maintained its previous positions;

3. Units of the 40th Infantry Regiment were already north of Gallicano; and

4. Artillery of the 42d Infantry Division would have occupied positions north of Castelnuovo.

On 6 October, units of the 40th Infantry Regiments were identified in Gallicano and Barga and on the 7th a new battalion—the 165th—is mentioned in Lama. On the 8th the presence of the 1st Battalion, 40th Infantry is confirmed in the region of Castelnuovo.

On the night of the 13th and 14th, prisoners captured by units to the west stated that the 2d Battalion, 40th Infantry had replaced the 3d Battalion, 25th Infantry in the coastal regions, making it apparent that the 2d and 3d Battalions, 40th Infantry Division were in action along the coast. We also knew that some units of the 232d Infantry Division were being sent to the Castelnuovo region. On the 18th the presence of the 1st Battalion, 40th Infantry near Castelnuovo was confirmed and prisoners declared that they had strict orders from Hitler to fight to the last man. On the 19th some prisoners were captured from the 1,044th Infantry Regiment, 232d Infantry Division confirming the presence of part of that unit in the sector to which we had been assigned. On the 22d, more units of the 25th Infantry Regiment were identified in our zone of action. On the 27th we were advised that a new division consisting of Alpine Fascists was on the way to our sector, and on the 28th we imprisoned some Italians from the Monte Rosa Division.

The overlay made by G-2 on the 29th of October showed us the disposition of the enemy forces after the substitution of the 42d by the Monte Rosa Division. The daily report of 1 November reveals the capture of prisoners belonging to the 6th Infantry Regiment of the San Marco Division (Italian), indicating the possibility that this regiment was occupying positions previously held by Germans, and that the Germans, farther to the rear, would occupy positions from which they could reinforce or counterattack.

It was obvious that our northward movement had to be executed cautiously. Our in-

formation concerning the enemy was neither abundant nor exact, and the varied number of large units identified in our sector gave rise to all sorts of possibilities concerning the forces which we might be forced to fight.

The maneuver of enemy troops during the months of September and October was intelligently and ably adapted to the terrain. Initially, they executed minor delaying maneuvers, quickly abandoning the even terrain, which did not offer conditions favorable for defense. Next, in more undulating terrain, they executed retreat maneuvers accentuating resistance along the roads leading to the mountainous regions. They presented relatively little resistance in the famous Gothic Line which everyone expected would be very difficult to breach, and established themselves easily and economically farther back in a solid mountain position, thanks to the road which had been built between Castelnuovo di Gargagnana and the seacoast. Thus it was possible for them to save their troops and to launch them through the Serchio valley, whose penetration demanded stronger forces.

We must stress the high degree of training of the enemy, tested by hard experience, veteran of five years of war, and subjected to rigid discipline. Especially the younger men, educated under a totalitarian German regime, revealed profound convictions and, consequently, a resolute decision. The officers were accorded royal prestige among the troops, in view of the professional experiences they possessed.

Besides the perfect technical training, the German soldier showed an exact comprehension of questions of a tactical order. Fire discipline was one of his dominant characteristics; provoked in all ways he will only reveal his position when the technical characteristics of his weapon assure him of success in striking the adversary. He was cold, prudent, and traitorous. Processes little recommended were often put into practice in an effort to terrorize; in the still of the night he would crawl to the warm body of an adversary in order to attach that infernal machine—the booby trap—which would murder the defenseless soldier in the fulfilment of his pious duty—the burial of the dead.

6th Combat Team (Brazilian)

The Brazilian forces which, under the command of General Euclides Zenobio da Costa, entered the line on 15 September 1944, were made up as follows:

Units or Services	*Officers*	*EM*	*Total*
Headquarters	11	22	33
6th Inf Regt	151	3,101	3,252
2d Bn, 1st Howitzer Regt motorized	35	483	518
Reconn Platoon	2	32	34
Engineer Detachment	8	207	215
Signal Detachment	3	90	93
Maintenance Company	8	111	119
Medical Detachment	13	159	172
Motorized Transportation Platoon	3	56	59
MP	2	54	56
Graves and Registration Platoon	1	16	17
Total	237	4,331	4,568

After 15 September this team of the FEB was reinforced by the following units:

One Tank Company from the 751st Tank Battalion;

Two Tank Destroyer Companies from the 701st Tank Destroyer Battalion.

Operations

At 1600 on 12 September, the detachment of the FEB which was attached to the IV Corps of the Allied army was first to substitute American units in positions north of Pisa (region of Vacchiano) and then to attack in a general northward direction.

These units were stationed in the Vada region. They were, therefore, ordered to move immediately to an intermediate point —the region of Ospedaleto—some thirty-one miles from Vada. The movement was completed by nightfall of the 13th.

That same night General Zenobio received Field Order No. 11, issued by the IV Corps,

which assigned to the FEB (6th Combat Team) the following missions:

"In the zone of action whose limits are shown on the attached overlay you will:

"*1.* Replace elements of the 2d Battalion of the 370th Infantry Regiment by 2400—9-15-44.

"*2.* Replace the 434th AA Battalion by 2400—9-15-44.

"*3.* Maintain contact with the enemy and reconnoiter his positions by vigorous patrol action.

"*4.* In case of an enemy retreat, pursue him as per orders from this HQ.

"*5.* Maintain contact with the 1st Armored Division (operating to the east)."

During the night of the 15th and 16th, patrols were sent as far forward as the 80th parallel, but contact with the enemy was not established. Under these circumstances, the Commander of the Detachment decided to change the disposition of his troops and issued verbal orders to this effect. On the same day the localities of Massarosa and Bozzano were occupied, the Detachment having reached the line: Monte Communale —Il Monte.

Field Order No. 54, issued by the IV Corps on 16 September 1944, was a confirmation of the verbal requests made by the Commander of the Detachment. We were, therein, authorized to occupy Massarosa and the nearby hills, numbers 467 and 354.

On the 17th we had reached the main line: Monte Chilardona—Il Vecoli—Colle Santa Lucia. Resistance was limited to enemy artillery fire in the regions of Quiesa and Massarosa.

From the information obtained, it could be concluded that only after crossing the 90th parallel to the north would we be able to make contact with the enemy. It was decided therefore to occupy immediately the city of Camaiore and move the unit north in order to confront the elevations which characterized the outer ring of defenses of the Gothic Line. By nightfall of 18 September the right flank had established contact with the enemy.

On the 19th operations continued in order to make contact along the rest of the front. By nightfall contact was general and we occupied the line La Rena—Fattoria after an offensive launched by the 2d Battalion of the 6th Infantry Regiment.

This same day verbal orders were issued to occupy the Prano mountains at the edge of the Apennines, and key to the defensive system that the enemy was trying to fortify. In spite of the enormous difficulties presented by the abrupt slopes of the mountain, in seven days we had occupied the Prano (altitude 4,000 feet) and penetrated the Apennine chain. The battle had cost us only five dead and seventeen wounded.

On the night of the 25th and 26th the enemy, a part of whose forces had already become exposed, broke contact, leaving the positions of Monte Valimono and Monte Acuto in some places strongly organized. This was the rest of the front occupied during the operation. The difficulties presented by the terrain, full of high peaks and deep valleys, made it impossible for us to maintain contact.

The 27th was spent in patrolling actions which exhaustively searched out the enemy, without making contact. We prepared ourselves once more to move the entire unit forward, when new decisions of the IV Corps modified our zone of action and assigned us a new offensive mission.

In ten days we had advanced about eleven miles on a front of nearly six miles. Thus ended the first phase of operations in which the detachment of the FEB took part.

Field Order No. 2, issued by the IV Corps on the afternoon of the 26th, assigned us the following mission:

"*1.* In the new zone of action to advance in the general direction of Castelnuovo di Garfagnana, moving the main force along the valley of the River Serchio.

"*2.* Maintain contact with Task Force 92."

During this new phase of operations the Commander of the Detachment intended to conduct actions in force along the Serchio valley and have reduced coverage of the mountains to the west.

It was necessary therefore, immediately to readjust the disposition of the Detachment in order to move the main effort along the Serchio valley. This was done progressively without affecting the advance. Originally, the 3d Battalion of the 6th Infantry Regiment was shifted to the east flank, in order to replace an American Battalion (3d Battalion, 370th Infantry) which had been left in our zone of action. On 30 September the movement of the 1st Battalion, 6th Infantry was begun and, as a result, the zone of action of the 2d Battalion was enlarged, since it was assigned to cover the Serchio valley. The 2d Battalion of the 1st Motorized Howitzer Regiment prepared new positions in the region of Val d'Ottava.

On the 30th, units of the 3d Battalion occupied Fornoli and established contact with the enemy, who on 1 October was identified in the regions of Capanne and Osteria. West of the Serchio, resistance had been met to the south of Paina Secca.

The extensive demolitions of the enemy in the Fornoli-Fornaci area seriously obstructed our supply, forcing us to mark time for a short period. General Zenobio personally supervised repairing of the Lucca-Castelnuovo road, reinforcing the Engineer Company with men from the Antitank Company of the 6th Infantry Regiment.

On the 1st and 2nd, torrential rains made the situation even more precarious. However, the decisions of the command were already taking shape.

Two battalions were deployed along the Serchio valley, while only one was deployed over the rest of the mountainous zone.

On the morning of the 4th, it was decided to renew the advance, and on the 5th, the left flank of the 3d Battalion reached the western region of Fornaci, while the right, by the end of the day, had not by-passed the populous areas of Ghivizano nad Osteria, due to the difficulties of the rain. On the 6th, however, the 3d Battalion of the 6th Infantry occupied the localities of Coreglia Antelminelli and Fornaci, where we found a munitions and airplane-accessories factory which the enemy had not had time to destroy. The enemy was now located in Barga and Gallicano.

The 7th was completely occupied with patrolling actions in an attempt to discover the strength of the enemy. On the 6th the IV Corps decided to move the reserve Battalion of the Detachment (1st Battalion 6th Infantry Regiment) to Camaiore, this unit to be employed only upon previous authorization of the Corps. Also, the 2d Battalion of the 1st Motorized Howitzers (minus one battery) was placed at the disposition of the Corps Artillery. It was also decided that we should maintain the positions reached, and that we should renew the advance only when ordered. The small forces controlled by the IV Corps at the time justified General Crittenberg's decision, since he foresaw the necessity of reinforcements.

Reconnaissance of Barga and Gallicano on the 8th and 9th verified that both of these localities had been abandoned by the enemy. In view of this, General Zenobio requested permission to make a new advance with the Detachment, and on the 11th the city of Gallicano and the road between the two cities were occupied. Strong resistance met in the regions of Molazzana, Monte Faeto, and Calomini impeded our breaking the enemy lines south of Gallicano.

We received intense enemy artillery fire, especially in the regions of Bolognaona—Catta Rozzo and Barga. On the 12th we engaged in active patrolling, and on the following day two companies of the 3d advanced to the east of Serchio, almost a mile along a front of over three miles. The 7th Company, operating to the west, had not been able to advance. On 14 October, the 1st Battalion, 6th Infantry and the rest of the 2d Battalion of the 1st Motorized Howitzers were returned to the command of the FEB Detachment. Patrolling was intense, maintaining close contact.

On the 15th, the 1st Battalion of the 6th Infantry concentrated along the main effort (in the vicinity of Borgo a Mozzano and Pian della Roccia) and the 2d Battalion of the 1st Motorized Howitzers attempted to reach the region of Cardoso. Reconnaissance

of Montefegatese verified the absence of the enemy in that area. The Engineers worked intensely on road repairs, and finished constructing a bridge in the region northwest of Castellaccio, greatly facilitating movements on the west bank of the Serchio.

On the 19th the Artillery Group was reorganized. The offensive action awaited only the authorization of the IV Corps to advance on Castelnuovo di Garfagnana.

In order to conquer Garfagnana we had first to occupy the heights of Calomini, Molazzana, Trepignana and Lama di Sopra, from the east of the Serchio; the progress of the operation would be regulated by the reactions of the enemy. Elements of a new large unit (1,044th Infantry Regiment of the 232d German Infantry Division) had been identified on our front.

The 21st was spent in intense patrolling. On the 22nd, the reconnaissance platoon arrived at the front and was stationed at Borgo a Mozzano as a reserve of the Detachment.

The IV Corps, which in the beginning had placed us under the obligation of maintaining one company of the 2d Battalion on the west flank of the zone of action (4th Company) decided to release it, and so it too was sent to the Borgo a Mozzano region, where it arrived on the 23d. The 24th, 25th, 26th and 27th were spent in small movements, which improved our positions.

Sommocolonia was occupied on the 24th and the regions of Trassilico and Verni were occupied on the 25th. On the 28th, we took Monte Faelo and Hill 437, to the west of the Serchio.

On the 28th, after determining the situation of the enemy who had assumed positions along the Gallicano—Castelnuovo di Garfagnana line to our front, it was finally decided that we could execute the first part of the maneuver, which would be the capture of the last-named locality.

Field Order No. 15, issued 28 October 1944, confirmed the intentions of the command and made readjustments relative to time and missions, "in the first phase to conquer the heights of Calomini, Colle Casela, San Quirico, Hill 906 (southwest of Lama) and Lama di Sotto; the 6th Infantry Regiment, after the occupation of this line, is to reconnoiter the heights of Bruciano, Montaltissimo, Cascio, Tropignana, and Sasseto; the Artillery Group will support the progress of the Infantry to the Cesarana-Montaltissimo transversal (inclusive); the reconnaissance platoon will operate in the region of Borgo a Mozzano. Actions east of the Serchio will begin at 0600, 30 October 1944."

On the 29th, elements of the 2d Battalion (west of the Serchio) took possession of Calomini, with no reaction from the enemy, and the 1st Battalion of the 6th Infantry occupied the line of departure on the night of the 29th-30th.

Torrential rains falling early on the 30th retarded the beginning of the attack, which did not start until shortly before 0800. Throughout the day the 2d Battalion, west of Serchio, unleashed, through patrols, a vigorous diverting action. By the end of the day, after arduous progress over rough and extremely slippery terrain caused by the heavy rain, the objective was reached.

On 1 November 1944, pursuant to the Corps order, General João Batista Mascarenhas de Morais assumed command of all forces which made up the 1st Expeditionary Infantry Division and consequently assumed responsibility for the operations of the 6th Combat Team. On the same date Corps decided to employ the Brazilian troops in another sector in which the enemy had shown a great deal of activity—the Reno River valley—in the direction of Bologna, towards which the Fifth Army advanced.

An order was issued on 1 November creating two groups of forces directly subordinate to the command of the Expeditionary Infantry Division:

East of the Serchio: 6th Infantry Regiment (less the 2d Battalion);

West of the Serchio: 2d Battalion of the 6th Infantry and 1st Platoon of one of the companies of the 751st Tank Battalion.

The reconnaissance platoon was to occupy Coreglia Antelminelli and, with the 6th Infantry Regiment, cover the line Coreglia--Pian di Coreglia.

The Artillery Group (2d Battalion of the 1st Mechanized Howitzer Regiment, one company of the 701st Tank Destroyer Battalion, and one company of the 751st Tank Battalion) was assigned missions of direct support, counterbattery and long-range fire.

On the night of 1-2 November, units of the 92d American Infantry Division began replacing the Brazilian troops which operated in the Serchio sector, and our units, as rapidly as they were relieved, were sent to the new zone of action. On 4 November, the 92d Infantry Division assumed the responsibility for the defense of the Serchio region. This ended the second phase of operations of the 6th Combat Team of the Brazilian Expeditionary Force. In this phase we had nine dead, fifty wounded, twenty-nine missing in action, and had captured 102 enemy prisoners.

The following is a résumé of the activities of the Detachment of the FEB:

A. Progress made:
1st Phase: about 11 miles;
2nd Phase: almost 14 miles;
Total: about 25 miles.

B. Length of front:
1st Phase: about 6 miles;
2nd Phase: almost 12½ miles.

C. Prisoners captured:
1st Phase: 31 (German);
2nd Phase: 188 (German and Italian);
Total: 219.

D. Casualties:
Dead: 14;
Wounded: 69;
Missing in action: 29;
Total: 112.

The Army Air Force

Digested at the Command and General Staff School from an article by Major P. W. Mead, Royal Artillery, in "The Journal of the Royal Artillery" (Great Britain) October 1945.

Introduction

THERE has been much controversy on the subject of Army Air cooperation. The object of this paper is to consider the different forms of air support required by the army, and how these requirements can best be met. Other roles of air power will also be considered, with a view to finding a solution of the army problem which will not prejudice other essential needs.

Necessity for Reform

The writer feels strongly that certain features of the air war have been proved unsound or otherwise most unsatisfactory during the last five years, and that the most drastic and energetic steps should be taken to avoid the same errors in future wars. Outstanding among these features are:

(a) The failure of the RAF to provide adequate close support for army operations.

(b) The attempt by the RAF to achieve decisive results by long-range heavy bombing, their failure to do so, and the consequent diversion of material, industry and labor from the manufacture of air weapons most likely to assist in the war effort.

(c) The failure to use light aircraft as a standard means of intercommunication within formations, which has hampered and retarded army operations to an unnecessary extent.

(d) A lack of appreciation by air force officers of the army's problems.

The Army's Requirements of Air Support

A modern army requires the following forms of air support:

(a) Direct air support, which is the equivalent of close artillery support.

(b) Strategic air support, i.e., air attacks on dumps, communications, enemy airfields, and other targets beyond the immediate battlefield.

(c) Fighter cover, particularly over the battlefield aid line of communication.

(d) Reconnaissance, including strategical and tactical reconnaissance and air photography.

(e) Artillery observation and control of fire.

(f) Liaison and intercommunication.

(g) Transport of troops, units and formations by air.

(h) Supply by air.

(i) Ambulances.

Each form of air support will be discussed separately.

Direct Air Support (D.A.S.)

"Practically all success in war, which is won by the proper cooperation of all arms, must in the end be confirmed by infantry, which, by closing with the enemy, compels his withdrawal or surrender, and holds the objectives which have been secured or the points of importance which have to be protected, as a base for further action." (F.S.R. II, 1935, Sec. 4 (i).)

Many events have ocurred since 1935, but none to disprove and many to confirm the views expressed in this quoted extract from F.S.R. The difference between the German drives into France in 1940 and into Russia in 1941-42 is to be seen largely in the extent to which they succeeded in pushing on their infantry closely in rear of their armored thrusts.

The Stuka attacks of 1940 succeeded because they cleared the way for the advancing German infantry. The massed heavy bombing by the RAF in the Caen sector in June 1944 failed, because sufficient German weapons remained unneutralized to check the advance of the Allied infantry. Many other examples could be quoted.

The object of D.A.S., therefore, as is the object of close support artillery, is to give direct assistance to the infantry (or on occasions to armored troops). Its roles are, in the attack: to soften up enemy defenses, to engage specific strongpoints of weapons impeding the advance and in the defense: to assist the artillery and infantry support weapons in breaking up the enemy's attack.

For close support (whether artillery or air) to be effective, the following conditions must be satisfied:

(a) There must be *close liaison* between the main and the supporting arm. The latter must be fully in the picture as to the intentions and requirements of the former, the two must know and have full confidence in one another and must be in close touch throughout the whole operation.

Communication between the two arms must be of a high order, in order that the supporting arm's attacks may be delivered at exactly the right place at the right time, and may be corrected or switched to fresh targets as the main arm requires.

In the case of artillery support this is achieved by the affiliation of artillery units to infantry units during training, by placing artillery "in support" or "under command" of infantry or tank commanders during the battle, by the constant presence of an artillery officer at the infantryman's elbow or in the tank commander's tank, and by first class communications between the two arms. There is absolutely no reason why the same results should not be achieved in the case of air support, provided only that the air forces are clearly regarded as the supporting arm, with the sole over riding duty of meeting the army's demands.

(b) *Flexibility* is essential. It must be possible, at very short notice, to switch the attacks of the supporting arm from one target to another, in conformation with the operations of the main arm.

This is achieved in the case of artillery support, by the expedient of placing artillery "in support" (not under command) of infantry commanders. It is thus available to these commanders to support their local operations, but available also to the formation commander, who can, by a word to his Commander, Royal Artillery, concentrate the whole of his artillery onto a given objective.

One of the greatest objections, voiced by the RAF, to the allotment of aircraft to army units is that the aircraft would be employed "in penny packets" and would not therefore be available for the big blows which the commander desires to make against important targets. This argument will not

hold water. Aircraft *should* be available for use "in penny packets" in support of local operations by small units. They *must* be decentralized to these units, in order that the units shall know what air support they have available, and shall be able to receive it quickly when required. On the other hand these aircraft will still be available for the big blows referred to above.

Reverting for a moment to consideration of a local small-scale operation, just as the infantry or tank commander can turn to his supporting gunner (in the middle of the operation) and request a change of target, so also should he be able to do in the middle of an air attack. And, thanks to radiotelephony, there is no reason why this should not take place.

(c) *Speed* is also essential. One of the chief charges levelled by infantry against gunners used to be that they were intolerably slow. Much of the training of the last ten years has been aimed at improving this state of affairs. Speed in meeting demands for artillery support is achieved chiefly by good communications, secondly by drill to ensure speed in action.

Speed in applying air support can also be achieved by good communications (both from forward troops to airfields and from forward troops to the supporting aircraft), and by the constant presence at airfields of air units at instant readiness to go out in support of specific army units.

The D.A.S. requirements of the army can be summarized as follows:

(i) Aircraft and weapons of the best types to give close support; and many of them.

(ii) Organization of D.A.S. resources into units which are specifically under command of army formations, both during training and in operations.

(iii) Subdivision of D.A.S. resources into self-contained air units, which can either be placed in support of army units or centralized, at will.

(iv) Organization of these air units in such a way that the air unit commander or his representatives moves alongside the army unit commander whom he is supporting, and that FOO's (analogous to artillery Forward Observation Officers) move with forward ground troops and are in a position to direct air attacks on targets selected by the ground troops.

(v) All personnel of air units to be thoroughly acquainted with army methods. Every air force officer and man should receive the same general tactical training as his equivalent rank, in for example, the artillery.

(vi) Speed and flexibility in the technique of applying air support.

It will readily be seen that the present system does not meet the army's requirements.

It is impossible, owing to this lack of decentralization, for army units to receive prompt air support. Air support is therefore regarded as a weapon only to be used in a deliberate operation against prepared positions, when other forms of attack have failed. Owing to this lack of accuracy, however, it is not altogether as suited to this task as is artillery, and is far more suited to the task of quick neutralization of enemy weapons impeding the advances of a force which has outrun its artillery.

Finally the long communication channels by which air support demands have to be sent and the necessity for full briefing of pilots before take-off inevitably prejudices the speed and flexibility which can be achieved in such an operation. From all these considerations one can reach but one conclusion —the army must be supported by its own air arm, organized in the same way as the field artillery and analogous to it in almost every aspect.

This section cannot be concluded without referring to at least one operation in which the methods suggested were to a great extent employed. The Chindits, for their 1944 campaign in Burma, were allotted a specific air formation, the 1st Air Commando Group U.S.A.A.F. This group had no other task than to support the operations of the Chindits. At various periods during the campaign the Chindits also received support from other U.S.A.A.F. units and from the RAF. Each column included the personnel

and communications necessary to control air attacks, and demands for air support went back, through the minimum signals channels, to the air force unit concerned. The Americans, who were army personnel and therefore saw nothing strange in the intimacy of this liaison, insisted on no detailed briefing before a mission; they simply flew to the target area and took their orders from the ground controller with the column. This system achieved outstanding success. The closest liaison—and friendship—was established between the individuals above and below, and the exceptional accuracy of the air attacks and coordination of the combined operations was a measure of this liaison. The system probably reached its acme of perfection during 77th Infantry Brigade's successful assault on Mogaung. The monsoon was in full swing and the aircraft of the 10th U.S. Army Air Force could only reach the target at uncertain intervals between the storms. In spite of this, liaison between air and ground was of a higher order. Every air attack was directed on a decisive objective, and, step by step, the ground troops were enabled to force their way into Mogaung, with the air attacks immediately preceding them. It is hoped that this is a glimpse of things to come.

Strategic Air Support

" . . . When once the aim or objective has been decided upon, all efforts must be continually directed towards its attainment, so long as this is possible, and every plan or action must be tested by its bearing upon this end.

"This introduces a second main strategical principle, the *concentration* of effort, which means that the greatest possible force —moral, physical and material—should be employed at the decisive time and place in attaining the selected aim or objective." (F.S.R. III, 1935, Sec. 3 (3).)

Strategic bombing is a weapon used for the first time during the present war. Previously it was not possible to attack the enemy's bases, his L. of C. (Com. Z), his bivouacs in rear areas; now all this is almost routine. In view of the short experience we have of this type of weapon it is unwise to be too dogmatic regarding its employment.

The army will usually prefer that our strategic bomber resources be concentrated on targets such as bridges, roads, railways, defiles, troop concentrations, supply dumps, airfields and the like. In addition to these, however, there is another form of target against which action may, at some time or another, be necessary. This type of target may be referred to as a "war potential" target. Examples are armament and aircraft factories, coal mines, oil wells, and refineries, shipbuilding yards, etc.—targets whose neutralization is unlikely to affect directly military operations, but may have some effect on the ultimate course of the war.

A third type of strategic bomber target is afforded by enemy harbors, and shipping within them. Clearly the size and employment of our strategic bomber force is a matter in which other and higher authorities than the army will have to control.

Nevertheless, it is essential that the principles of war be kept firmly in mind when considering this problem, and in particular the principles of *concentration* and *maintenance of the subject.* At any given moment in the war, the nation must have one single war aim in view. This may be the defeat of the enemy in the field, his starvation by blockade, the destruction of his morale by attacks on the civilian population and its amenities, or the destruction of his war potential before assaulting him by land and sea. Whatever the aim, however, it is necessary that it be kept constantly in mind, and that the total available resources of the country are concentrated in pursuing it.

Experiences in this war, both during the German air attacks on Britain in 1940-41 and during the Allied attacks on Germany in 1942-44, must lead to the conclusion that neither the destruction of morale nor that of war potential is possible, except when the victim is an unprepared nation or one untried in war. If it is considered practicable or desirable to attempt to defeat a nation by blockade, the Ministry of Economic War-

fare must have a strong voice in the selection of targets for strategic bombing attacks. When, however, it is the immediate aim to destroy the enemy on land, the army must have the predominant voice in the selection of targets, and in deciding what proportion of our air resources shall be directed against "war potential" targets, strategic targets, and in direct air support.

The varied nature of the tasks which may fall to the lot of the strategic air force of this country, and the varying authorities who may from time to time have the predominating influence in their selection, will probably be quoted as good reason for the existence of an independent air force. In fact, however, as the U.S. Army Air Force has proved, an army air force is as capable as an independent one of attacking any form of objective, while, when employed on strategic or D.A.S. roles, it will be of the greatest advantage for reasons already indicated if the air force is an army organization.

Fighter Cover

Support by fighter aircraft is required by the army for the following purposes:

(a) To preserve air superiority over the battle area, to prevent our ground forces from being pinned down by enemy air attack and thus losing their mobility and freedom of action.

(b) To protect our L. of C. (Com. Z), from enemy air interference.

(c) To prevent enemy air reconnaissance, and thus assist in achieving surprise.

These roles are in fact shared between the fighter aircraft force and the antiaircraft batteries in the area of operations. The closest coordination between these forces is necessary if the protection they afford is to be effective. Furthermore, they share many of the same technical accessories, such as radar stations, control rooms, etc., and it is clearly of great value if both organizations are under the same commander. Since they contain large bodies of mobile troops, whose maneuvers must be closely linked with the remainder of the army, it seems clear that this commander must be the army commander.

Fighter aircraft are also required for the protection of long-range bomber missions. In this role they should clearly be under the same command as are the bombers.

Reconnaissance

During the present war great reliance has been placed in air reconnaissance of all types. Photo reconnaissance has undoubtedly proved its great value, owing particularly to the great improvements in camera performance and the high scientific standard of photo interpretation. On the other hand, it is possible that a tendency has arisen to place overmuch faith in tactical and strategical reconnaissance from the air, which has sometimes led us into making errors. Arnheim being apparently an example of this.

Such reconnaissance has nowadays to take place in high-speed aircraft. It is carried out by RAF pilots who, having a rather sketchy idea of military matters, can rarely visualize accurately the problem of the soldier and what he wants to know. Furthermore, the information they bring back is filtered through the ALO [Air Liaison Officer], who is occasionally knowledgeable regarding military matters, but is no pilot, and can rarely visualize satisfactorily the pilot's point of view.

By making the air force squadron an army unit and cutting out the ALO, an improvement in this state of affairs would clearly be effected. Tactical reconnaissance squadrons would be in exactly the same position vis-a-vis the formation commander as is the reconnaissance corps today; information would be passed back in the same way, through the unit commander. Finally, most important of all, the man making the reconnaissance would no longer be primarily pilots and secondarily observers, but would be primarily cavalrymen and only incidentally pilots of aircraft.

Artillery, Observation and Control of Fire

The necessity of air observation and control of fire of artillery has now been fully recognized, and it has also been generally

agreed that a gunner officer is the only qualified person to carry out such a role.

At present, however, air O.P. [Observation Post] resources are far too small. Clearly the ideal is that the field battery—the most effective single unit of fire and maneuver—should have its own air O.P. resources—probably and air O.P. flight would be sufficient. Aircraft maintenance problems would probably necessitate the organization of flights into squadrons—one per field regiment. The normal scale now is one squadron per corps.

Liaison and Intercommunication

"To cultivate by all means the power to move and to act more rapidly than the opponent, i.e., *mobility*, is an essential requirement in all strategical preparation and execution . . ." (F.S.R. III, 1935, Sec. 3 (3) (vi).)

The army must move with the times. Regret it as they might, field units have had to say farewell to their horses and take to motorcycles and jeeps for reconnaissance, liaison duties, message carrying, and the like. Already the jeep itself is giving place to the light aircraft. Future development of the helicopter will undoubtedly hasten this tendency.

If we are to keep pace with the speed of modern war we must learn to regard air transport, not as a luxury, but as a normal adjunct to military operations. The object of these aircraft will be, not only to save trouble, but to save time.

The army's requirements are as follows:

(a) Every field unit, every field headquarters and most L. of C. (Com. Z.) units require light aircraft for short-range intercommunication, and for visits of commanders, staff officers, and instructors to subordinate and neighboring units and headquarters.

The scale of allotment of these aircraft should be comparable with that proportion of the present motor transport establishment of a unit which is allotted for mainly intercommunication purposes. Although the aircraft should be allotted to specific units as part of their establishment, they will probably, for maintenance reasons, have to be organized into squadrons.

(b) There must be a number of transport aircraft organized preferably on the lines of general purpose transport companies for the purpose of carrying over longer distances (i.e., between forward units and base headquarters) the large number of officers and men who have to make such journeys daily. The number of such aircraft required will vary widely according to the nature of other forms of communication in the theater of operations.

(c) These aircraft—both types—must be fully under army control.

The present situation regarding liaison and intercommunication aircraft is chaotic, and crippling to the efficiency of the army.

There are not, in the first place, enough liaison aircraft—either light aircraft or transport planes. Those which exist are RAF property, and are very definitely treated as such. The astonishing situation persists in which an aircraftsman of the RAF—engaged in a low-priority journey—can usually obtain an air passage without difficulty, an air force unit command or staff officer travels by air as by right, while senior army officer engaged in important planning has usually great difficulty in traveling by air, and even a brigade commander has to supervise his formation's training without the use of an aircraft.

Transport of Troops, Units and Formations by Air

Paratroop, airborne and air-transported operations have now become three of the standard operations of war, and their scope is likely to be extended still further in future wars. In general, the requirements of the army are fulfilled by the present troop carrying facilities and organization, with a few important exceptions.

Paratroop operations are obviously severely handicapped by the Gilbertian situation in which a soldier obtains his tommy-gun from one service and his parachute from another.

The first large airborne and air-trans-

ported operation carried out by the Allies was the fly-in of the Chindits into Burma in March 1944. For various reasons, no clear policy having been expressed at this stage, the army exercised the primary control of this operation, both in the planning and executive stage. The result, from the army point of view, was excellent, and certainly afforded justification for the view that control by the army is not only desirable, but practicable.

Supply by Air

In certain theaters of war, air supply is, and will continue to be, the normal system. In addition, in any theater, air supply may at any moment be necessitated by special operational conditions. As developments take place to increase the variety of articles which can be dropped by parachute, and to increase the accuracy of such drops, it is possible that air supply may eventually become the normal system in any theater of war. The existing system works satisfactorily, but would be improved considerably by making the transport unit an army one, as are the providing unit and the receiving units.

Ambulances

Evacuation of casualties by air has been carried out extensively in all theaters. Since inter-service jealously has usually given place to feelings of common humanity, this form of air support has probably suffered less than any other from divided control.

The Case for an Army Air Force

From the foregoing considerations it will be seen that a powerful case exists for the formation of a strong army air force. This would consist of Close Support, Strategic bomber, Fighter, Reconnaissance, Air O.P., Liaison and intercommunication (including light aircraft and transport aircraft), Troop-carrying (including transport aircraft and gliders), Air supply, and Ambulance units.

It is convenient to summarize here the advantages which would accrue from the formation of such a force.

(a) Army and air force officers and men would receive training on the same lines, and would acquire a similar outlook on the problems confronting a force as a whole.

(b) In combined operations, such as those already considered, the air force would take its correct place, along with artillery, engineers, etc., as a *supporting* arm, with the one object of assisting the operations of the main arms—the infantry or armor.

(c) There would be closer liaison, both during training and operations, and better communications, between the infantry (or armor) and its supporting aircraft, and therefore quicker, more flexible, and more effective close support.

(d) There would probably be better concentration of effort in strategic bombing.

(e) There would be close liaison between antiaircraft and fighter units, both during training and operations.

(f) Results of reconnaissance of all types would be more reliable, as a result of the general military training received by pilots and air force commanders, and the elimination of the ALO.

(g) Liaison and intercommunication between and within units and formations would be vastly improved by having liaison and transport aircraft at the direct disposal of the army.

(h) Paratroop, airborne, and air-transported operations would benefit from unified army control.

(i) There would be a tremendous saving in personnel, particularly staff officers, by eradicating the necessity for inter-service planning and operations.

Air Force Roles, Other Than Those in Support of the Army

Air forces are used for roles other than those in support of the army; some of these have already been discussed. These roles are:

(a) The air defense of national territory in conjunction with A.A. artillery, observer corps, etc.

(b) Long-range bombing of the enemy's "war potential."

(c) Long-range bombing of the enemy's naval installations.

(d) Carrier-borne operations.

(e) Land-based reconnaissance, and other operations, in support of the navy, now carried out by coastal command.

Some Objection to an Army Air Force

Although this paper makes no claim to be unbiased, there is no intention to evade discussion of the objections which have been raised from time to time to the formation of an army air force.

Some of these are:

(a) Necessity for a central body to direct the trend of technical design and development.

(b) Difficulty found by army commanders in appreciating air factors—particularly technical ones. Tendency of army commanders to misuse aircraft.

(c) Technical nature of the training required by air force personnel.

(d) Tradition.

Design and Development

It is admitted that some central body is desirable, not only to carry out aircraft design and to investigate new developments, but also, more important still, to determine what types of aircraft are needed, and in what quantity, in strict pursuance of our national defense policy and plan.

This body should not, however, consist of members of one particular service, nor should any one service predominate. The results of such a situation have clearly been shown in the present war. The central aircraft design and development board must, therefore, be a body independent of the services, and qualified to assess the country's aircraft requirements of war, both naval, military, and economic.

Army Commanders and Air Forces Factors

When aerial warfare was a novelty it was no doubt correct to say that army commanders were unqualified to control air units. This is no longer true. The education of an army officer, from the beginning, leads him to regard aerial warfare as an intrinsic part of warfare as a whole. During the present war, the air aspect has forever obtruded itself. Many army officers are qualified pilots, others have been ALOs. Anti-aircraft artillery officers have come in close contact with RAF fighter units; few field units have not at some period trained for air-transported operations, few have not at some time demanded air support.

Infantry Combat Operations

Translated and digested at the Command and General Staff School from a Russian article by Major B. Korol in "Krasnaia Zvezda" (Red Star) 20 July 1945.

THE combat experience of our troops offers many remarkable examples of skilful solutions to the complicated problems encountered in different types and stages of battles. We will attempt to analyze what in our opinion is one of those useful examples. It is taken from the combat experiences of a battalion commanded by a captain of the Guards.

The Germans, who were routed just below Lake Balaton and pursued by our units, were hastily retreating to the Austrian border. Our battalion, after several encounters with small screening forces of the enemy, came up to a railroad and highway intersection on the outskirts of a village, south of the town of Dier. The battalion was to capture this intersection and wait for further orders. It was to use the road leading directly to the west as its axis of movement. The assault battalions of the adjacent units were advancing to the right, that is, toward Dier.

After penetrating the enemy's defenses in the village, the battalion came out on the western edge, at the road intersection. The two rifle companies of the battalion (the third was kept in reserve) were deployed—the 5th Company facing west and the 4th facing northwest, in the direction of Dier.

The captain determined quickly that the flour mill, located on the outskirts, presented

the most advantageous observation post for the enemy since the southern approaches of Dier could be well observed from it. The Germans occupied three trenches to the left of the railroad, in front of which stretched an antitank ditch. The enemy position had a depth of about one and a half kilometers. The captain saw no hostile forces in the west, the direction in which the battalion was to advance. The reconnaissance reports confirmed the captain's observation. The adjacent battalion began to approach the trenches situated to the right of the railroad.

Considering the overall situation and his initial observations, the captain was able to reach the following conclusions: The Germans, evidently, were only now hurriedly taking up defensive positions in their previously prepared trenches. The attack should be carried out immediately in order not to give the enemy time to consolidate his positions. The captain informed his regimental commander by radio of the situation and requested permission to continue advancing, although he had already reached his initial objective. The regimental commander approved.

The sappers had reconnoitered a mine field, situated north of the intersection, along the railroad and they were given orders to clear it.

At the moment when the captain was considering how to execute the attack, five of our tanks and as many assault guns came out to the road intersection, apparently deviating to some extent from their route. Under such circumstances it is important that the infantry officer should be able to coordinate the action with the approaching tanks and quickly organize mutual support.

In this case the appearance of the tanks turned out to be very opportune. Both the commander's personal observations and the reconnaissance discovered three antiaircraft batteries which the Germans had emplaced between the trenches for firing upon ground targets. The enemy had artillery units deep in his defenses, and a machine-gun nest could be seen in his first trench. It was estimated that the enemy had no less than a battalion of infantry disposed in his positions.

It was decided to attack with two companies, supported by two attached batteries of 76-mm guns and 120-mm mortars. The latter were only now pulling up to the outskirts of the village because of the extremely rugged terrain.

The tank unit and self-propelled artillery commander was immediately called to the observation post, where the commanders of the rifle and mortar companies and of the other attached units were already assembled. Reconnoitering was carried on from only one observation post.

The Germans were silent. One of two things could be suspected: the Germans were making preparations to open fire or they thought that our battalion would continue its movement to the west and expose its flank.

It was decided not to bring the 5th Company into an attack position permaturely, so as not to reveal our plan. For the same reason, there was no fire preparation. The 5th Company was to advance on a signal, attack with its left flank, turn toward the north and, finally, close in.

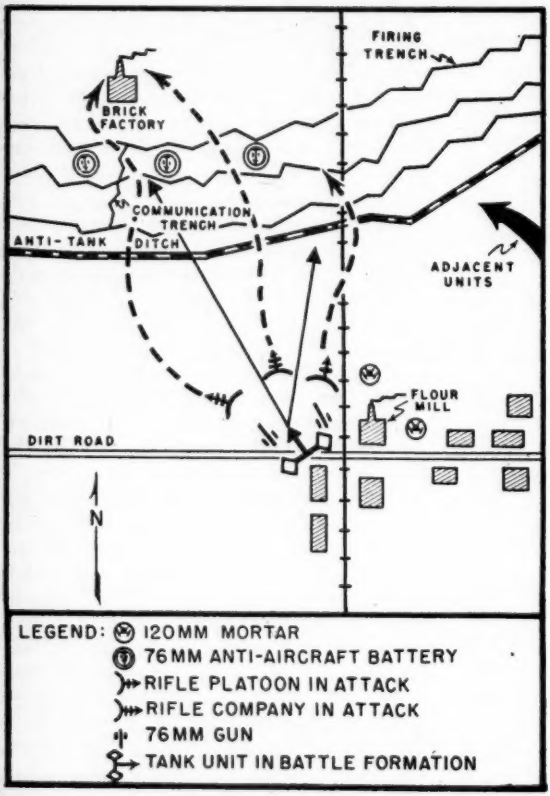
The 4th Company was to attack when the 5th Company was abreast. The basis of its tactical employment was an attack by the right-flank platoon. The platoon was to advance along the right side of the embankment, taking concealment behind small houses, and then pass through a ditch alongside the embankment. Coming out on the level of the first trench, the Company would occupy it and neutralize the firing points, since they could fire on the 5th Company's flank.

The first trench was slightly more than a kilometer away. This distance was to be covered under the support of mortar, tank, and assault gun fire. The assault guns, as agreed with the tank officer, would follow the infantry at a distance of 100 to 150 meters, firing while moving and taking cover behind the houses.

The sappers, attached to the battalion and the tanks, cleared the mines from 300 meters of the sector. When the attack was launched

they were to continue to clear the mine fields on the outskirts of the village in order to allow the installation of a 76-mm battery.

The 120-mm mortar battery took position on the northwestern edge of the village, in the vacant lots between the houses. Here, the battalion mortars were placed closer to the enemy positions. The 76-mm battery was still moving up toward their positions.



The 5th Company detailed a machine-gun unit to protect its left flank. This unit was supported by two antitank crews. This was quite logical, for though no enemy was sighted in the west, he could attack from that direction, since the road intersection was of tactical importance.

At a signal from the battalion commander, the 5th Company began to move up toward the 4th Company. It was advancing along the railroad bed. This was when the Germans first opened fire. Our mortar, tanks, and assault guns, counteracted by neutralizing the firing points in the first trench and the enemy's antiaircraft guns. Nevertheless the enemy was able to continue heavy shelling, especially when the tanks and the assault guns began moving forward and, therefore, our tanks and assault guns were forced by the enemy guns to continue firing from behind cover.

The 5th Company was pinned down by the fire of heavy-caliber enemy machine guns along the left flank, near the rail bed. The enemy concentrated most of his attention on this company, for it had moved into his frontal area and it had been the first to advance. The 4th Company could take cover behind the railroad embankment and the bordering houses. It also had encountered less fire resistance. In accordance with the battalion commander's plan, the 4th Company's right-flank platoon, concealed by the embankment and the houses, reached the ditch and, through it, the first trench. Here, they rapidly crossed the road bed, occupied the trench, and captured the first machine gun, the one which was keeping the 5th Company from advancing.

The short advance of this platoon, as was expected, played an important role. The 5th Company was then able to move forward. By rapid bounds, it reached a line about 100 meters from the first trench and there attacked. The entire trench was soon cleared of the Germans. Nevertheless, the latter opened fire from the second trench; simultaneously, an intense fire was directed on both the railbed and the houses behind which

the tanks and assault guns were concealed.

The mines had been by now completely cleared from the outskirts of the village. The 76-mm guns were moved into position, and opened direct fire against the hostile antiaircraft guns. The heavy mortars, shifted their fire to the same targets. Several mortar shells soon destroyed the antiaircraft guns on the enemy's left flank.

A howitzer artillery battalion arrived in time to support the infantry battalion. It fired on the second and third trenches, but the Germans continued to resist. The battalion operations now became trench warfare.

The 5th Company exploited its success. One of its platoons began moving up the communication trench toward the second trench, clearing the path with grenades. As soon as they gained access to the second trench, by order of the company commander, they immediately occupied the entrance to the third trench. This helped to break the enemy resistance in the second trench. Some of the enemy was wiped out, the remainder was captured.

At the same time, a group of our men captured a battery on the enemy's right flank. Already two guns had taken aim and they could have caused considerable delay to the advance of our battery. The crew of the center battery, finding itself in a hopeless situation, fired a few rounds and ran to the rear, followed by the fire of our rifles and machine guns.

The Germans still continued to fire from the third trench, with the support of their artillery. Again, using a communication trench, the troops of the 5th Company broke into the third trench. The fire of our artillery and mortars was shifted to a brick factory because a considerable number of enemy troops had retreated to that area. This factory had a position dominating the terrain, and without capturing it, it would have been difficult to advance farther.

The Germans in the third trench were completely wiped out, and an attack on the brick factory had begun. The attack started with a two-minute barrage by all our artillery. The artillery cooperated with and supported the battalion. With the capture of the brick factory, the enemy in the battalion sector was routed. The battalion took 200 prisoners.

Thus ended the engagement of the infantry battalion commanded by a captain of the Guards who carried it out on his own initiative after making a correct analysis of an unanticipated situation.

Concerning Information in Time of War

A large part of the information received in time of war is conflicting, a still larger part is false, but by far the largest part of it is imbued, to a considerable degree, with the element of uncertainty. What is to be required of officers under such circumstances is a certain degree of discrimination that only a good knowledge of pertinent facts and human nature is able to impart. As a rule, every one is more inclined to believe a bad than a good report. Everyone is inclined somewhat to exaggerate unfavorable circumstances and dangerous situations reported through these channels, though they may, like the waves of the sea, sink back to the place from whence they came, yet like these latter, without any apparent cause, continue to reappear. On firm reliance on his better, inner knowledge, the commander, like the rock against which these waves break, must stand immovable. His role is not an easy one. He who by nature is not apathetic or whose judgment is not tempered by the experiences of war may make it a rule for himself, forcibly, against the verdict of his inner convictions, to lean away from the side of apprehensiveness toward that of hopefulness. Only by so doing will he be able to obtain the proper balance.—*Carl von Clausewitz.*

The Role of Sea Power in World War II

Translated and digested at the Command and General Staff School from a Spanish article in "Revista General de Marina" (Spain) November 1945.

WHAT has been the role of sea power in World War II? What influence did the fact that they were able to make use of ocean routes have in the victory of the United Nations? Simply and plainly that except for the existence of sea power, *the United States would not have been able to take part in the struggle*, either with arms and men or with its powerful industrial system. And what would have been the result of the war if the coasts of America had constituted an insuperable barrier to aiding Great Britain in 1940, transporting American troops to the beaches of Guadalcanal in August 1942, or stopping Japanese expansion throughout the western Pacific?

In this war no great naval battles were fought in the Atlantic; there have been no serious clashes between powerful contingents, like the Battle of Jutland. In the Atlantic, aside from a constant, monotonous defensive action on the part of merchant shipping against submarine and air attacks, clashes between surface vessels have been confined to "pursuit operations." The engagement in the River Plate (pursuit of the *Admiral Graf Spee*), the pursuit and destruction of the *Bismarck* with its prologue of the latter's victorious battle with the *Hood*, and the battle of the North Cape (pursuit and destruction of the *Scharnhorst*), were episodes of the war which the public, impressed by the great land offensives, which are tangible on the map, and the great air raids which were so constant and spectacular, never associated in any permanent or intimate way with these offensives and air raids. In the Mediterranean, the absurd and incomprehensible inactivity of the Italian fleet, which on many occasions was definitely superior to the enemy fleet in the waters of the *mare nostrum*, prevented any major naval clashes in the theater. The battle of Matapan was the result of accident and lack of skill on the part of the Italians. In the Pacific, naval warfare was indeed more evident to the public in general, but here also, the air action that took place (as if the planes engaged were not based on carriers and their action were not naval after all) obscured the activity of the fleets, which did not become involved in any naval battles of the *classical* type.

Finally Germany, her industries and communications destroyed by the constant Allied air raids, and unable to endure the combined pressure of Russians and Anglo-Saxons, who from the East and the West, were breaking into the Reich with their enormous motorized formations, went down in a state of chaos. Japan, wearied of the pounding of her soil by the American flying fortresses with ever-increasing effectiveness, and without the material ability to react, finally capitulated just at the moment when destructive effects reached undreamed of proportions with the use of the atomic bomb against Hiroshima and Nagasaki.

In the final analysis, these were the determining causes for the annihilation of the powerful war machines of the Third Reich and the Japanese Empire. Indeed, given mastery of the air over the enemy's soil, the terrible effects of air raids on rear areas, without any reflection and aided by that tendency of the human mind to find simple explanations, it is easy to arrive at a conclusion similar to the following: the arm of the future is the airplane; all else has passed into history; classical means have reached an end and antiques must be relegated to museums.

This popular reaction is to be feared. It will occur again in history, and as was the case immediately after World War I, the battleship—and we do not know why it should constitute a public phobia—will be persistently attacked in books, magazines, and newspapers. Those who object to appropriating funds for the construction of fighting ships will believe they have the final argument in that with what it costs to con-

struct a battleship, several hundred airplanes can be built, and these perhaps loaded with atomic bombs. All this is very true and very convincing to the masses, but we are confronted with an illusion which we should point out.

Without minimizing the importance of aviation, which quite obviously is enormous, the truth is that the Allies *won this war because they were masters of the seas all over the world,* and they mastered the seas due to the *superiority of their fleets of battleships.*[1]

It is possible that there were English and American battleships that did not fire a single shot of their heavy artillery during the six years of the war and yet they have been the ones, by their mere existence, that made the Allied victory possible; just as it was the "dreadnaughts" of Jellicoe's "Home Fleet" which made possible the entrance of Foch's soldiers into Strasbourg in 1918; though in their case, many of the ships never opened fire even on the day when they took their position in the long Jutland battle line.

When the war broke out in September 1939, Germany had the most powerful army and air force in the world, but on the seas she definitely occupied a position of inferiority. The fleets of France and Great Britain combined were something like ten times more powerful than that of the Third Reich. Germany could not even think of maintaining traffic over the lanes of the Atlantic. Her merchant fleet was forced to seek quick refuge in neutral ports or along the German coasts in the North Sea. Germany had to give up overseas resources but she had already accumulated large stocks and counted on the economic assistance of the Union of Soviet Socialist Republics whose attitude at that time made the German situation an entirely different one from what it was in 1914. At that time Germany (the Central Powers) was a *maritime nation* (she could not have existed without sea trade). In 1939, Germany, due to the Russo-German Non-Aggression Pact, was a *continental power,* and could get along without sea trade.

France and especially Great Britain were, on the other hand, *maritime nations.* If they could not maintain their overseas trade they would perish. This trade was their vulnerable spot and Germany attacked it with all her might, with the only means at the disposal of a weak sea power—surface raiders, submarines, and aviation—naval units that due to their special characteristics are able to escape the vigilance of a powerful and admittedly superior enemy.

During the first months of the war her blows were very effective and the mercantile shipping losses grew to definitely alarming proportions. The surface raiders created grave problems for the Admiralty. Auxiliary cruisers operating in areas remote from the main routes of travel made necessary the shifting of powerful naval contingents. The threat created by the "pocket battleships" required the presence of battleships in the convoys and patrolling of thousands of miles with fighter planes based on carriers or on converted ships. Improvement of the Reich's submarines and the employment of original tactics rendered inadequate the number of destroyer escorts then available and required a solution to the need for more escorting units. Fifty old destroyers were purchased from the United States. The United States was also charged with the construction of a large number of "corvettes" and "frigates," which were the solution to the problem of a low-priced escorting vessel rapidly built. It was also necessary to take up the problem of the assembly line construction of merchant ships at a speed which would replace the losses that were being suffered daily as a result of German U-boat action.

The attacks on the convoys by German aviation were at the beginning very dangerous, for the ship concentration (a magnificent target for the planes) had no means of anti-aircraft defense. It was therefore necessary to provide all vessels with antiaircraft weapons—a thing which was much more easily said than done—and also to provide

[1] "Battleship" *is not a ship but a concept*—the union of maximum offensive power and maximum resistance. This concept is represented by a group formed by a fighting ship protected by a curtain of destroyers and covered by an umbrella of fighter planes based on a carrier, which is today a sort of Siamese twin to a fighting ship.

the escorting vessels with antiaircraft defense. But this proved insufficient and the conclusion was reached, one that was very hard to put into practice, that each convoy needed its own fighter planes for its antiaircraft protection. The Allies started installing catapults on their merchant vessels, resigning themselves to the economically dictated assumption that in the majority of cases each plane would serve only for a single flight and would be lost—after the pilot had been picked up—in view of the impossibility of hoisting the plane on board again. But almost immediately thereafter *escort carriers*, which were merely merchant vessels provided with a flight deck and having capacity for a small number of fighter planes, became general.

With fighter protection over the convoys, attacks by bombers without fighter escort became very hazardous and this menace was to a large extent eliminated; but in zones where, owing to their proximity to enemy coasts the attacking planes could be provided with a fighter escort, the danger still subsisted and it became necessary to reinforce the fighter protection over the convoys as they approached the coast and to employ destroyers, corvettes, and fighters, to fight off attacks by small boats and miniature submarines. It was also necessary to clear the zone of magnetic and sound mines.

The battle against the raiders was hard, long, and costly. The methods employed were the logical ones: *immediate protection of the convoys* and, at the same time, relentless *action against the raiders*, in their bases and at sea. This action consisted of two phases: *location* and *destruction* of the raiders. In locating surface raiders, utmost use was made of carrier-based planes or of planes catapulted from cruisers, and in their destruction, the fire of more powerful vessels. Units of the famous "K-force,"[2] sent in pursuit of the *Admiral Graf Spee* on 2 October 1939, were the ones required in the pursuit of raiders more powerful than cruisers.

At night the normal visual means of detection fail, but fortunately for the Allies, the introduction of electromagnetic detectors provided them with the best means for protecting their convoys. This invention, perhaps the most important one next to the atomic bomb, decided the battle of the Atlantic in favor of the Anglo-Saxons. From 1943 on, surface raiders were neutralized, the antiaircraft defenses of the convoys reduced to a notable degree the activities of air raiders, and the burden of the war against Allied shipping fell mainly on the submarines; but, as in World War I, the time came when the defensive caught up with the offensive, and with the destruction of more submarines than could be built, they too were forced to yield.

In spite of the enormous effort made by the Allies—the organization of convoys, the construction of an enormous number of escort vessels, the providing of merchant vessels with antiaircraft defense, the construction of escort carriers and of many fighter planes for protecting the convoys, nothing could have been achieved and a collapse would have been inevitable, which would have meant defeat for the Anglo-Saxons, if American industry had not been able to build merchant vessels at a speed necessary to replace the losses.

The superiority of the Anglo-Saxon fleets kept the main German forces off the seas and thus prevented them from blockading the British Isles. The results would have been the same, however, if the submarine attacks had succeeded in reducing the tonnage of merchant shipping below the amount required to carry on the war.

Germany could get along without sea traffic, but England could not live, much less carry on a war, without it. In June of 1940 when the German army reached the Pyrenees after defeating the armies of almost all of Europe, it was the sea that saved England. If at that time the Channel had dried up as the Red Sea did for the crossing of the Israelites, the motorized divisions of the Reich would have entered London in a few

[2] The "K-force" was composed of the cruiser *Renown* and the carrier *Ark Royal*. The operations of this group, which never established contact with the German "pocket battleship," lasted from 2 October to 27 December and during this time the vessels traveled 27,000 miles, and the *Swordfish* planes of the *Ark Royal* flew over five million miles.

days. What held back the German forces? Nothing but the British battleships. If Germany had had the means to fight them, in a single night 400,000 men would have crossed the Channel, and in view of the definite air superiority possessed by the Reich at that time, would have occupied England as they had just done in the case of France.

An English Pearl Harbor, which in 1940 might perhaps have been possible, would have solved the problem. At that time the fleet was not prepared to meet air attacks, and although today such a thing is an impossibility, at that time it might have had results comparable to those produced by Yamamoto's attack on the American Pacific fleet and by Cunningham's highly successful attack on the Italian battleships anchored at Taranto in November of the same year. But some airmen had become too imbued with the theories of Douhet. Goering especially was an airman *à outrance* (with an Olympic contempt for other arms) and he had influence with the Führer. The German army could not cross the Channel? All right: Goering's air units would bomb the principal English cities and industries. The effects would be catastrophic. The morale of the people would drop—Douhet had assured it in his famous book—and England would sue for peace.

The raids against England began in earnest. Destruction and death became the regular routine, entire nights were spent in air-raid shelters, women and children were the innocent victims. There were practically no fighter planes over London. Things could not possibly go better, but the morale of the English people did not break. What was happening? Well, the morale of nations holds up much better than is usually believed. Many more tons of explosives and many more attacks were needed. That is to say, many months during which the air supremacy must be maintained—and that is where they failed. Air supremacy is always ephemeral. The construction of a few new types of planes superior to those used by the enemy, or the achievements of a production line, can change it within a short period. The air formations sent out over English cities began to meet an increasing fighter opposition. The cost in bombers destroyed in each raid finally became prohibitive. Daylight attacks had to be discontinued; the same thing had to be done later with night attacks. Douhet's theory had failed. What had happened? The British air might, *supplied by American industry by sea*, had been able to overcome the crisis. Was England saved by her fighter aviation? Undoubtedly so, but indirectly; she was saved by her ocean convoys which brought from America the planes, spare parts, and weapons needed to attain superiority; as well as the pilots, mechanics, and observers trained in Canada to man them.

If these convoys had not sailed, England would not have been able to rebuild her air power (she would have had no planes, pilots, or gasoline) and the Germans would have maintained their air supremacy. The British Isles would have been reduced to the status of the Japanese home islands after the occupation of Iwo Jima and Okinawa.

The struggle in Africa depended on the maintenance of water communications across the Mediterranean. The Axis was not able to secure free passage for its forces from Italy to Libya, and it was defeated, sandwiched between Montgomery's Eighth Army and Eisenhower's Anglo-American divisions which landed in western Africa in spite of Rommel's tactical ability and the fighting qualities of the Afrika Korps. Was the battle of Africa decided by the intervention of Eisenhower's Anglo-American army? Undoubtedly so, but we have here the same situation as the one which prevailed in the case of English fighter aviation. Without being able to cross the Atlantic, this army, even though its strength had been ten times greater than it actually was, would not have been able to participate in battle, just as Germany was unable to do anything in June 1940 when her army was held up on the French Channel coast.

It hardly seems necessary to comment on

the war in the Pacific. The whole American offensive strategy was geared toward *conquering positions needed to attack Japan from the air and strangling its maritime commerce.* But in order to achieve this, it was necessary to conquer intermediate bases (Gilbert and Marshall Islands, Saipan, Tinian, Guam, the Palaus, the Philippines, Iwo Jima and Okinawa), and all these operations, where the fighting spirit of ground and air forces was tested, had as their purpose the protection of the transports which carried them to the place to be attacked and which later on would supply them.

If we examine a map of the world and consider the role played by the United States in the defeat of the Third Reich and the Japanese Empire, we reach the conclusion that the military might of Great Britain and the Union of Soviet Socialist Republics would never have been able to face the fallen enemy *without the enormous assistance of American industry,* but at the same time, we all realize that victory would not have been possible if the military power of the United States (on the ground, on the seas and in the air) had not applied itself in an indomitable desire to win. At present the Jugoslavian partisans and the French *maquis* consider themselves responsible for the victory, and it is even possible—human imagination has no limits—that they have their particular arguments to justify their claims that through their efforts Hitler and Japan were conquered. But this, of course, is only the fruit of their imagination. The fact is that in 1940, Germany had swept all military power from continental Europe and was opposed only by Great Britain, protected by the sea, and the Union of Soviet Socialist Republics with its enormous human resources and vast territory. Victory was decided by the crushing weight of American industry and military power. American industry saved English sea communications from collapsing and protected the British Isles from German air attacks in the summer of 1940. This same industry also provided the Soviet armies with the armament they needed. Then afterwards, American ground forces and air formations struck in Africa, leaped to Italy, landed in Normandy and invaded Germany, while other American forces, with Australian help, conquered bases in the Pacific and attacked Japan with their flying fortresses.

Without minimizing the British resistance, Churchill's tenacity and confidence, and the heroism of the modest partisans, we must admit that the war was won by the United States; that in order to win it they had to get their enormous industrial capacity and military might across the two major oceans of the globe, the Atlantic and the Pacific; and that to accomplish this they had to establish *maritime superiority* over the main arteries of the world's sea lanes. *Sea power,* which is the ability to make use of the sea lanes for commercial traffic and the transportation of military forces, is also the integration of three factors: *power, bases, and transportation.* American industry and organization have created the most powerful naval and merchant fleets in the world, and the bases required to have the dominion of the sea have been obtained either through agreements or force—and at extremely high costs.

Now that the war is over, the United States Navy desires to retain the bases necessary for exercising its influence over the world's sea lanes and it considers desirable the possession of nine bases in the Pacific (Adak, Balboa, Hawaii, Tinian, Saipan, Guam, Manus, Iwo Jima, and Okinawa) and six in the Atlantic (the Bermudas, Newfoundland, Panama, Guantánamo, San Juan, and Roosevelt Roads). It has also shown great interest in Dakar, Iceland, and Greenland.

This is natural. The United States possesses today a navy which is more powerful than all the other navies of the world combined, but it knows well that *a navy without bases is as useless as a lever without a point to rest on.*

Today we can already observe what we might term the Anglo-Saxon domination of the world's sea lanes. The United States will control the routes across the Atlantic and

the Pacific, and England will dominate the Mediterranean-India route on whose flank the Union of Soviet Socialist Republics is seeking to establish itself (Russian desires in the Dardanelles, the Balkans, and the Italian colonies of Libya and Eritrea).

What repercussions will the atomic bomb —which it is logical to assume will be further improved—have in a future war? No one is capable of answering this question. The first effect of the atomic bomb is, in our opinion, to make war impossible—*as long as the bomb remains the property of a single nation.* Afterwards, when the atomic bomb becomes general and can be manufactured by several nations there will be wars, but the atomic bomb probably will not be used. No nation will dare to be the first to employ it, just as no nation dared to use gases in the war that has just ended for fear of reprisals.

At the moment, only the United States possesses the secret of the manufacture of the formidable new weapon and is the only nation that can use it. The possession of this secret makes the United States master of the world. With a navy greater than twice the combined navies of the world, with an air force beyond comparison, with several million battle-trained soldiers, its gigantic industry, and the atomic bomb—could not the United States if it so desired, bring the rest of the world to its knees?

Happily, God has given this power to a noble-minded nation and has done this out of His infinite kindness, in order that humanity might not be plunged into chaos. The gigantic strength of the United States, mightily reinforced by the atomic bomb, is the only guarantee for the reconstruction of the world.

The Czechoslovak Armored Brigade

Digested at the Command and General Staff School from an article in "The Tank" (Great Britain) December 1945.

The story of the Czechoslovak Independent Armored Brigade Group at Dunkerque is a story of versatility, courage, and morale, which pays an immense tribute to the keenness, patience, and training of the officers and men concerned. The fact that an armored formation could adapt itself to static conditions in flat, wet, and depressing country, and live in squalor for seven and a half months while maintaining a vigorous and alert policy was perhaps unique.

The Armored Brigade was formed mainly from infantry troops who had escaped from France and who were converted into armor on 1 September 1943. There were considerable delays in the training and equipping of the unit, and it was finally ordered to France in August 1944, before it had received its full complement of Cromwell tanks and before it had had a complete brigade exercise. On its arrival in Normandy it was concentrated in the Falaise area to give it an opportunity of completing its training.

The German garrison at Dunkerque was estimated at between 12,000 and 16,000 men. There were also many civilians, of whom upwards of 17,000 were subsequently voluntarily evacuated. The perimeter held by the enemy was roughly twenty-one miles and was in the form of a semicircle with the town as the central point. The General Officer Commanding the Brigade was given command of the 7th Battalion Royal Tanks and of the 107th Antiaircraft Brigade, reinforced by the 150th Field Regiment. A considerable part of the southeastern and southern fronts was under flood, behind which the enemy established his positions. A constant nightly boat patrol was maintained on the southeastern flooded sector by troops of the Engineer Squadron—a novel and difficult task, due to the many obstacles in the nature of barns, houses, trees, etc., met in water which in places was fifteen feet deep.

As the Brigade had only two armored Regiments and two Motor Companies instead

of the usual three, it was obvious that the containing of the enemy garrison, primarily an infantry task, entailed the grounding of tank crews and the use of all available troops in a ground role as well. The dispositions were made with the 7th Royal Tanks occupying the western end of the line and the Czechoslovak Motor Battalion the eastern end, each with an Armored Regiment as their next-door neighbor. These were obviously the most likely points for an enemy attempt to break out.

The situation was not quiet for long. On its first night in the line, the enemy attacked the Reconnaissance Squadron in a southwesterly direction from Dunkerque. The Squadron withdrew under pressure of numbers, without loss of prisoners, and within forty-eight hours the positions were retaken. Thus ended the first and only even temporary success of the enemy against Czechoslovak troops. On 28 October the enemy must have received a shock, as a daylight attack commenced in the morning achieved complete surprise and magnificant results. The 2d Armored Regiment, using tanks, and one Motor Company, captured or destroyed a complete German Battalion suffering infinitesimal losses. This aggressive policy was continued and on 6 November a second attack was launched in the same sector. Perhaps the preceding strafing by Typhoons warned the enemy, as the attack did not achieve the same astounding results as the previous one, though a heavy toll of Germans was taken, in killed, wounded, and prisoners. The enemy obviously had been busy distributing mines and tank obstacles in the intervening week, and movement was very restricted and only possible after much clearance work.

A quiet period ensued and as a considerable number of Czech nationals had been liberated by the advance through France, and others who had been forced into the German Army had been captured, the manpower situation had improved considerably. Therefore, it was decided to bring the Brigade up to full strength by the addition of a third Armored Regiment, a third Motor Company, and a third Field Battery. Using the Reconnaissance Squadron as a basis, a school for Armored Training was established at Hazebrouck, and the expansion scheme was begun. The school opened on 15 December and individual training was completed by 18 February. The Motor Company were to a great extent trained on the spot, as was the Field Battery and in addition some invaluable assistance was forthcoming from RAC [Royal Armored Corps] Schools and training establishments which enabled the Armored Regiment and the Motor Company to be ready, with reinforcements, for operational engagements early in May. This feat of training whilst actively engaged with the enemy was magnificent and was a great credit to the tirelessness of the officers involved and to the keenness of the personnel concerned.

The winter passed reasonably quickly despite the fact that action was limited to patrolling. Apparently part of the RAF and the USAAF, together with others, did not know that Dunkerque was still in enemy hands. Allied planes were shot down with alarming frequency, despite the fact that strenuous efforts by our artillery to prevent the enemy from manning antiaircraft artillery positions were made each time an Allied plane appeared in the vicinity of Dunkerque. Some casualties fell in neutral ground between the opposing lines, and some very brisk fighting took place for possession of the occupants.

During the operation of the crossing of the Rhine, General Officer Commanding Dunkerque Force received orders to engage all enemy antiaircraft artillery positions, jam all wireless as far as possible, and distract the enemy's attention from any friendly aircraft that might enter the Dunkerque area. Accordingly a fire program was laid on, which was to last for seventy-five minutes at the time when our airborne troops should be in the vicinity. The operation was successful in keeping the enemy's head down, for in addition to the artillery and antiaircraft artillery weapons at his disposal the Commander used all available tanks and antitank guns. German officers interrogated subse-

quently stated that the effect was devastating and asked the reason of the bombardment—a proof of its success. As a matter of fact, only some thirty to forty of our gliders were seen well to the south and it would appear that they were not sighted by the enemy, and no news of their passing was wirelessed to Germany.

Early in April information obtained from prisoners of war and from some officer patrols which were captured behind our lines, showed that the Germans were going to put in a reasonably large-scale attack in the west and southwest. All possible precautions were taken and extra support in the form of mobile tanks arranged. On the evening of the night the attack commenced, one of the officer prisoners gave us complete information of the direction and method of attack, which was immediately passed by liaison officers to each of the units involved. A fair amount of panic ensued leaving a garrison regiment of Royal Artillery with its right flank open and the Czechoslovak Antitank Battery with its left flank open. Efforts to restore the position next day were not successful.

At this time the three units which had been added to the brigade were being mobilized so that the Czechoslovak and British Staffs were extremely short of sleep. The attacks ceased quite suddenly, however, when on instructions from the Commander in Chief an exchange of prisoners was arranged as a preliminary in the bombardment of Dunkerque by heavy aircraft. At great personal risk to themselves, a British and a Czechoslovak officer, carefully avoiding mines, went into Dunkerque with a flag of truce, and made complete arrangements. The number of prisoners had increased considerably, as prior to the April attacks there had been only seven Czechs and twenty-one French, apart from the Canadian and British prisoners taken before the Czechoslovak Brigade arrived at Dunkerque. They now amounted to twenty-one Czechs (including eight wounded) and 115 French, plus the early crop and airmen. The exchange was duly carried out, in fact we gave the Germans a few extra for good measure.

Immediately following the exchange, sixty Mitchells arrived and conducted some extremely accurate bombing of vulnerable points in the forward areas. It had been proposed to Army Group that in addition to the heavy precision bombing that was to take place, medium bombers and fighter bombers should attack the outside positions, as it was felt that the tendency of the garrison would be to move out as soon as it was seen that serious bombing on the town was to take place. As a matter of fact the Germans had anticipated the bombing because of the hurried exchange of prisoners, and as far as possible the entire garrison remained underground for three days and three nights.

At this point morale was adversely affected, and to the credit of the Czechoslovak Brigade it was the only time during the long period that it fell noticeably. It might be said that a good part of the disappointment was due to the advance of the Allied armies eastward towards Czechoslovakia and that all efforts to release the Brigade for service in its own country were unavailing. They were, however, able to release a token force of roughly 150 all ranks to be sent on for entry into Czechoslovakia with the United States Army.

After some careful calculation on the part of General Officer Commanding, Commander Royal Artillery and Liaison Headquarters, it was decided that the war was getting near enough to the end to warrant the extra expenditure of artillery and tank ammunition. Whereupon a plan was made for an uninterrupted three days' bombardment. The night before it was put on, such keenness was shown that the ammunition expenditure was doubled. From subsequent information this bombardment certainly had a most desirable effect on the Germans. The burial parties were most active, and when the capitulation came, the hospitals contained 683 wounded. Also there was not a single headquarters or billet that had not suffered. These officers and men who had been manning searchlights

until a short time before, had put up a most creditable performance during the German attacks. There was never any sign of wavering and they outfought and outlasted the Germans on every occasion, and produced some very fine individual acts of heroism.

The Czechoslovak Armored Brigade withdrew, turning over the commitment to L. of C. [Communications Zone] Battalions, French Battalions and 17th Army Group Royal Artillery to prepare to start on its long journey to Czechoslovakia. The journey of 680 miles by the entire Brigade, which included the three new units, was made quickly and in most excellent order, which closed, in triumph, a great feat of endurance carried out with high morale, excellent spirits and never-flagging aggressiveness, under most trying, depressing, and forlorn conditions.

The Selection of Fighter Pilots

Translated and digested at the Command and General Staff School from a Russian article by Major S. Ribakov in "Krasnaia Zvezda" (Red Star) 28 October 1945.

It was just another day among the many days of war, and we were in a radio-locater station, not very far away from our infantry's front lines. Not all was quiet in the sky. The enemy was annoying us with his many attempts to bomb our positions. In order to repulse the numerous enemy attacks, our fighters had to stay "on the beam."

Early one morning the observation post reported that a group of hostile dive bombers was approaching. The air operations officer immediately informed the Yak group commander, whose job was to provide the air cover, of this fact.

"Seagull II!—a group of Junkers approaching from the west at 1200 meters. Attack immediately."

The air-patrol commander replied that he had already spotted the enemy as he headed toward the approaching enemy. Judging, however, by the sluggish bank of the plane and its slow, flattened maneuver, it was doubtful that the engagement would prove successful.

"Junkers are approaching. Intercept them immediately!" ordered the operations officer. While calculating the distance between us and the enemy planes, the operations personnel suffered a few tense moments. Will they make it? In the imagination of everyone present the Junkers jettisoned their load of bombs on our front line positions.

Losing altitude, the Yaks approached the Junkers. However, when they finally reached the enemy, the patrol commander, evidently not having yet decided how to attack the enemy planes, slipped by the enemy formation. Judging from the conduct of the Yaks, it did not appear that they had the fighting spirit nor the zeal required on such occasions. Instead of striking at the head of the bomber formation and breaking it up, the patrol commander for some reason decided to attack the rear; by this time the lead flights had begun to "peel off" for the dive.

"Seagull II, what's going on up there!" shouted the infuriated operations officer. This exclamation, which would have otherwise stirred the professional pride of any other fighter-pilot, did not affect the apathetic commander. He conducted what seemed to be an attack and then left the formation to make another attempt at attacking.

A couple of planes, however, improved the situation somewhat by directing their initiative sensibly. When the rest of the patrol headed by the commander passed by, these two planes broke sharply away from the formation and boldly attacked the lead flight of Junkers; the enemy suffered two casualties: one bomber started losing altitude and the other fled, smoke pouring from its en-

gines. Seeing this, the rest of the Junkers jettisoned their loads haphazardly.

At the very climax of the aerial fight, a general—the commander of the fighter unit—drove up to the radio-locater station. The general, who himself was credited with bringing down a large number of enemy craft, picked up the microphone:

"Seagull II—pursue the enemy! Don't give them a chance to escape."

But it was already too late. The bombers consolidated their formation and, firing their machine guns, turned back to the west. Our patrol commander, not even trying to pursue them, also gathered his group together.

Why was this engagement so unsuccessful? Was it because the patrol commander was so pusillanimous? No! He was a brave and experienced pilot. He did not have the spirit of a real fighter-pilot. He was simply misplaced in the beginning of his pilot training.

This pilot was much too composed, his personality make-up did not suit the job. He had not the impulsive temperament nor the urge for pursuit—he had nothing that distinguishes a good fighter from the run-of-the-mill pilots. In battle, he had not the spark that makes a fighter.

One indeed may find all types of people in pilots. These types cannot be determined merely by their deeds. These are pilots who conduct themselves well in combat, who are willing to help their comrades in arms, and who are skilled pilots. However, it sometimes happens that such a pilot, having completed dozens of missions, is not able to credit himself with much success. Among fighter pilots these men are usually classed as "mediocre." One encounters pilots who are shy, even might give the appearance of a "sad sack," but in the air they are "aces." In the air they become imbued with the real fighting spirit, the desire to pursue and meet the enemy. Their rapid maneuvering tactics wins one engagement after another.

The days when the profession of flying was considered something out of this world, are gone forever. But in order to become a true pilot and find a proper place in the service one must fulfil many qualifications. Everything depends upon one's individual characteristics and personality traits, and much depends on how well these qualities have been developed in the period of training. As to the latter, the pilot must be assigned to the type of flying where his abilities can be developed to his best advantage. It must be remembered that the outward appearance alone cannot disclose the actual qualities that make a pilot. A flyer on the ground may show in his mannerisms the appearance of boldness, determination, and incentive, thus impressing others as being a "hot" pilot; however, quite the opposite traits are brought out when engaged in actual combat. And should this "young blade" find himself in a jam then one will discover that all his apparent boldness and arrogance are gone. No matter how much his commander or his colleagues may try to improve him, this pilot will never be successful. Experience has shown that the commander can determine the fighting ability of his pilots only in actual combat.

Now let us go back to that unsuccessful patrol commander we began discussing above. That night the young lieutenant reported to the general's quarters.

"How could you allow the Junkers to escape unpunished and permit yourself to act with such indifference?" demanded the General.

"They dropped their loads without inflicting damage to our lines, Sir, and therefore I didn't deem it necessary to follow them up," replied the lieutenant casually. Then he explained further that we would have certainly attacked the Germans the second time had they attempted to break through to their target. Having listened to the pilot's report, the General thoughtfully made his decision. The pilot was transferred to a different branch of the Air Force. This reassignment was not dealt as a punishment, for the decision made by the General was a fair one. By transferring the pilot from a fighter group to another branch of the Air Force,

ne had relied upon those qualifications which promised to make of the Lieutenant still a successful flyer. And we may add here that the General's decision was not in error since the pilot found a right place for himself in aviation. In two months the army press carried stories of this pilot's combat achievements and successes. This new, but no less dangerous, assignment was more to his liking, for there he found his true calling.

The question arises, could this Lieutenant have been assigned to the proper place in the beginning of his flying career? The answer is, yes. In actuality, however, one may still meet a pilot who has not yet found his proper niche in aviation. And occasionally his commander overlooks this fact, while the pilot, due to false pride, refuses to acknowledge his predicament. What is the reason for this? It seems to us that the reason is to be found in the aviation school where the young pilot begins his flying career. It is there that his first trainers, instructors and pilots often approach the matter superficially, without taking personal interest in the cadet's individual inclinations and aptitudes.

A group of one hundred recruits, for example, has just arrived at a training school for fighter pilots. After completion of training, all these young men are assigned to fighter aviation. But, can all these young pilots lay claim to the title of a "fighter-pilot"? Far from it! No doubt the majority of them will prove to be equal to the claim. But there will be those who, due to their particular personal traits, will not be fighter-pilots in the true sense of the term, even though they may fly the fighter planes. Are the instructors aware of these facts? Yes, for in the process of training, at one time or another, it becomes evident to everyone that a certain cadet cannot ever become a full-fledged fighter. But it seems that a transfer to another branch of the Air Force or else an expulsion from the training school is, for some reason, not considered proper. "Should I 'wash him out' or transfer him—they'll think that I'm a poor instructor," the training officer may think to himself. Thus, as a result, that man, who could have been a successful pilot in some other branch of the air services, remains but a mediocre pilot and, needless to say, of little use to his fighter group.

Undoubtedly, during the time of war and with the phenomenal growth of aviation, the conditions did not permit careful selection of fighter-pilot cadets. At the present moment this cardinal problem, concerning the entire system of the preparation and training of young pilots, should be approached with the knowledge gained in combat.

A weak nation has no friends or allies. A weak nation does not know when it may be offended or disillusioned. The world belongs to the powerful, and it will be so for many years to come. It is wise to preach justice, to preach constantly that force must submit to justice, but without failing to organize our own forces, the only guarantee at present of the freedom and dignity of nations.

—President José M. Velasco Ibarra of Ecuador
in *Cultura Militar y Naval*, Cuba

The French Expeditionary Corps in Italy

Translated and digested at the Command and General Staff School from a French article by General Carpentier in "Revue de Défense Nationale" (France) October 1945.

Winter Campaign

ON 18 March 1943, by General Order No. 8, General Giraud designated General Juin as Commander of the French Expeditionary Corps. This order included all the forces intended for service in a European theater of operations. The plans of the moment called for four armored and nine infantry divisions. The task of activating these units was immediately begun, but progress was very slow due to the Tunisian operations and the necessity of waiting for the arrival of American matériel.

After the Tunisian campaign had come to an end, a careful inventory of the available human resources in North Africa (both French and native) and a more exact estimate of the needs of a modern army in the matter of extra-divisionary services and units required several times the modification of the original program and led to the adoption, in the end, of a plan calling for three armored and four infantry divisions of the American type, and one mountain division. From June on, the American matériel was unloaded at an increased tempo in the ports of Algiers and Casablanca where, night and day, great assembly lines were in operation. The equipping of the units was begun and they began their training in Oran and Morocco.

On 2 August 1943, the General Staff of the French Expeditionary Corps (FEC) moved to Trouville near Oran for the purpose of directing the intensive training of the large units that were now ready or in process of being equiped: the 1st Armored Division, the 5th Armored Division, the 2d Moroccan Infantry Division, the 3d Algerian Infantry Division, the 4th Moroccan Mountain Division, and Moroccan Arab forces (*gouns*).

By September, the development of the operations undertaken by the Americans in Italy made apparent the necessity for organizing the FEC in such a way as to be able to send it into action, if need for it arose, with minimum of delay. It was, therefore, broken down into two parts, two "landing corps," the first corps comprising all the large units that were already equipped and being trained, and the second, those that were to be equipped later.

On 16 September a part of the 4th Moroccan Mountain Division and the 1st Group of Moroccan Cavalry were placed at the disposal of the Commanding General of the 1st Corps for operations in Corsica.

The 1st Landing Corps included the 2d Moroccan Infantry Division, the 3d Algerian Infantry Division, two Moroccan cavalry groups, general reserve elements, and units of Base 901 and the services.

It was decided that these units would be employed in Italy as part of the American Fifth Army and that they should constitute "Army Detachment A" under the command of General Juin. This term "Army Detachment" was never used and the French in Italy were alway designated as the French Expeditionary Corps.

By the end of December all of the FEC had arrived in Italy, having landed early in the month, and went into action alone. From the 11th of the month, it was committed in the sector comprised between Castel San Vincenzo on the north and Lagone on the south under the American VI Corps. It fought in extremely rocky terrain and bitter cold against an extraordinarily stubborn resisting enemy. From the 14th to the 17th, it fought at San Michele Pass, where positions changed hands several times; from the 18th to the 27th, it took Mt. Pantano, the village of Cerasuolo, Mt. Castelnuovo, and Mt. Mainarde.

Finally, on 3 January, General Juin took over the command of the sector where we were relieving the American VI Corps. At the start he had the 2d Moroccan Infantry Division on the north and the 45th American Infantry Division on the south. But the American Division was later relieved by the

3d Algerian Infantry Division under the command of General de Monsabert.

On 11 January 1944, the FEC had, therefore, both of its Divisions in the line. The sector between Castel San Vincenzo on the north and Concacasale on the south was entirely in French hands. Its neighbors were, on the right, the 78th British Infantry Division of the Eighth Army and, on the left, the XI Corps of the American Fifth Army of which the FEC was a part.

A few brief remarks relative to the general situation in Italy, the terrain and the enemy, will permit us quickly to define the limits of the operations of the FEC during the winter campaign (11 January to 15 March). On 11 January, the battle of Italy had not yet really begun. After the Salerno landing and the junction of the forces of the Fifth and Eighth Armies on the general line Naples—Termoli, it became obvious that the Allies did not have enough forces to engage in a decisive battle. The Germans had at their disposal in the northern part of the peninsula a maneuverable force that could stop any attempted landing. Moreover, the equilibrium of the forces now in contact, forced the Allies to confine themselves to successive frontal attacks by the Eighth and Fifth Armies. The progress of the Allies was, therefore, very slow, which gave the Germans time to prepare, in the Abruzzi, a solid position with which to cover Rome. Starting 10 December, the Fifth Army, after crossing the Volturno, established contact with this position whose front limits were, in the sector we are concerned with, the heights to the west of, and dominating the Volturno. It was some twelve kilometers in depth and so organized that an attacker would meet ever increasing resistance as he progressed into it. The rear limit was the Gustav line. When the 2d Moroccan Infantry Division went into action, the Americans were stopped on the line Mt. Castelnuovo—village of Cerasuolo—Mt. Pantano—Lagone. The operations of the 2d Moroccan Division, at that time under American command, improved the situation locally. But the appreciable contribution of the FEC was to permit General Clark, commander of the Fifth Army, to resume the offensive and attempt to reach Rome.

His plans to this end were: first, to advance as far as the Rapido; and secondly, to cross the river in order to open a pathway for his armor in the valley of the Liri. This operation was to be combined with a landing operation, half way to Rome, to facilitate frontal attack by draining the German reserves.

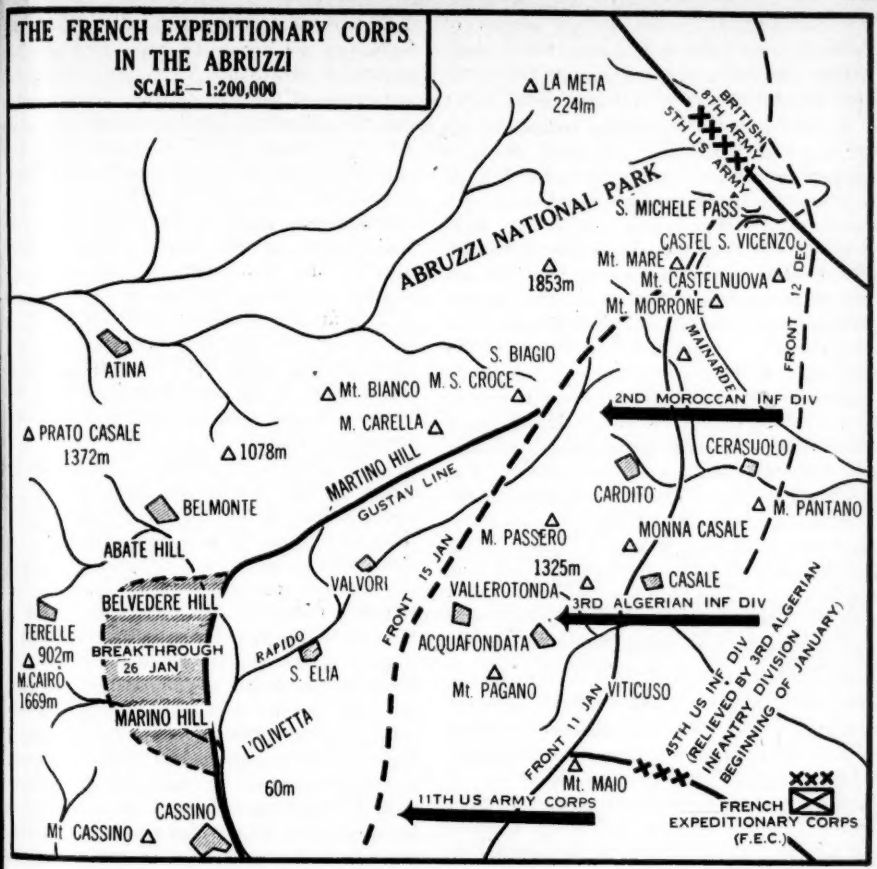
The Battle of Costa San Pietro and Monna Casale (12-16 January)

In the first place, the mission of the FEC was to participate in the attack of the Fifth Army, with the object of reaching the Sant' Elia-Atina transverse highway, having contact on the south with the American II Corps, whose attack started on 8 January, was developing in a favorable manner.

The terrain in which the FEC was to operate was extremely difficult. It was a section of the Abruzzi that was completely shut in on the north by Mt. Meta, covered with impassable snow drifts. The sector, regarded as a whole, was chaotic and mountainous and gave an impression of confusion that defies description. There were, however, two principal features: the valley of the Rapido which crossed it in a northeast-southwest direction; and two roads leading into it—San Biagio Hills—Atina and Pozzili—Acquafondata—Sant' Elia, separated and dominated by the lofty Monna Casale, which commanded the entire region between the Volturno and the Rapido.

In such a terrain, the enemy found remarkable opportunities for defense. He was solidly established on a line running approximately north-south through Monna Casale and anchored to Mt. Meta by way of Mt. Morrone and the Pass of San Michele. Severely shaken by the action of the 2d Moroccan Infantry Division since 11 December, he had reinforced himself and, taken altogether, the forces facing each other were approximately balanced, but we had air and artillery superiority.

The FEC found itself facing a formidable



position. Under these conditions, General Juin estimated that in order to reach the objectives, a breakthrough operation would be necessary so that the FEC could get to the general line Costa San Pietro—Passero —Monna Acquafondata-Maio.

The 12th of January was the day for the attack. It began at 0630 after a fifteen-minute artillery preparation. By the end of the day, all objectives had been reached with the exception of the summit of Monna Casale and Mts. Passero and Acquafondata. But Costa San Pietro, one of the strongpoints of the enemy position, was now in our hands and the furious and incessant counterattacks of the enemy had failed. During the 13th of January the summits of Monna Casale, Monna Acquafondata and Mt. Passero were taken in desperate fighting. In spite of violent counterattacks, especially against Costa San Pietro, the advance continued, and by the evening of the 13th the village of Cardito was occupied, the slopes of Santa Croce and Mt. Ferro had been reached, the village of Acquafondata taken and passed by 1,500 meters, and Mt. Pagano was also in our hands. The actions of the two days had, therefore, ended in the penetration of the defensive position, and on the evening of the 15th our two divisions occupied the general

line Costa San Pietro—eastern slopes of Santa Croce—Colle dell' Arena, crests dominating the valley of the Rapido in the southeast and eastern crests of Sant' Elia.

Unfortunately, the extreme fatigue of the attacking divisions did not allow them to prevent the enemy from establishing himself in a position along the line San Biagio—Mt. Santa Croce—Mt. Carella—Colle San Martino—Mt. Cifalco and the southern heights of Belmonte, a position covered by the advanced positions established on the heights immediately northwest of the Rapido. This was the Gustav line, the rear limits of the German position.

On the 16th, our positions were improved by the taking of Valvori and of Mt. Il Lago; Sant' Elia, evacuated by the enemy, was under the surveillance of our patrols. The balance of the five days of battle represented a tactical success for the FEC. The losses of the enemy had been severe. All the units of the German 5th Mountain Division had been engaged and it had been so severely punished that the German Command had been forced to summon hurriedly units from other sectors of the fighting front to support it.

The Battle of Santa Croce (21-23 January)

South of the FEC, the attack conducted by the American Army Corps had developed favorably. Mt. Trocchio was taken on 15 January, and the Rapido having been reached over a large part of its course, the Commanding General of the Fifth Army decided to complete the second phase of his maneuver: the crossing of the Rapido with a landing in the rear of the enemy. The crossing of the Rapido was to be effected by the American II Corps protected on the north by the FEC, that was to advance towards Atina.

In this general plan, the Commanding General of the FEC decided to breach the enemy's position in the center, in the direction of Mt. Bianco—Atina, in order to bring about the fall of Belmonte and San Biagio by surrounding them in case the operation was successful.

The attack of the American II Corps was to start at 2000 on the 20th; that of the FEC was set for 0530 on the 21st. The attack began at the appointed hour. The southern crests of Mt. Santa Croce and the crests northwest of the Rapido were quickly taken, but the difficulties of the terrain, the stubborn resistance of the Germans who were solidly entrenched in the rocks and blockhouses and supported by reserves on the opposite slopes, made it impossible to occupy the summit of Mt. Santa Croce. Furious attacks and counterattacks succeeded one another for its possession on the 21st and 22d. It finally remained in the hands of the enemy. On our left, the American II Corps, after getting about half a regiment across the Rapido, at the cost of heavy losses, was unable to maintain its position and was forced to withdraw.

The landing south of Rome, however, in the Anzio district during the night of the 21st and 22d was successful, encountering only a weak resistance. To stop the advance of the French Corps which was threatening to force the defense position of the Abruzzi, the German Command had to commit the 3d Motorized Division, which happened to be in reserve in the vicinity of Rome. This reinforcement had not gone unnoticed. During the night of the 19th and 20th, the day before the start of the attack on Mt. Santa Croce, three prisoners had been taken who belonged to one of the regiments of this division. Nevertheless, General Juin decided to carry on the attack, because by engaging important German forces, he would help the Allied landing. General Clark officially expressed his appreciation for this and thanked the FEC for having contributed to the success of the Anzio landing.

The Battle of Mt. Belvedere

Although the landing was successful, the crossing of the Rapido constituted a reverse. General Clark decided to resume the operation on 25 January. But this time he first occupied Cassino, pillar of the German position, and the heights which dominated it to the northwest.

The main attack was to be launched by the 34th American Infantry Division protected

on the north by the 3d Algerian Infantry Division, which was to occupy Mt. Belvedere and Colle Abate. The attack of the FEC had been resumed on the morning of the 23d in the direction of Mt. Bianco—Atina. Its effort, which had been directed toward the center and in a northwesterly direction, was to be transferred to the left, in a westerly direction. The rearrangement of units that this change involved, was a real feat, but it was accomplished.

By the night of the 25th, the units had taken up their positions. The 2d Moroccan Infantry Division, adopting an attitude of active defense to fix the enemy forces on its front, was ready eventually to support the 3d Algerian Infantry Division.

The enemy occupied the high terrain and the Belmonte valley. The enemy positions followed the slopes of Mts. Cairo and Belvedere, then bent inward and crossed the Belmonte valley on a line with Mt. Olivetta, and reached Mt. Cifalco.

In the fighting, often confused, which took place from the 25th on, the following was outstanding:

The 25th and 26th of January: penetration of the Gustav line.

The period from the 27th to the 30th: maintenance of the breach which the enemy attempted to stop and reduce.

The period from the 31 January to 5 February: definite consolidation of the breach.

Penetration of the Gustav Line (25-26 January)

On the 25th, by 0830, the valley of Belmonte had been neutralized by our units which had occupied positions on the heights dominating it on the east (Hill 470) and west. Thus protected, the 4th Regiment advanced into the valley, crossed the enemy line at the point where it bent inward and, sacrificing everything for speed, attacked Mt. Belvedere and, with their equipment on their backs, climbed 800 meters in spite of heavy enemy resistance.

This success of the FEC offered the Fifth Army the opportunity to attack the rear of the enemy defenses on the heights between Cairo and Cassino. The position occupied by the 3d Algerian Infantry Division constituted an excellent base for an attack in a southerly and southwesterly direction.

On the 26th, the 3d Algerian Infantry Division, in pursuance of its mission, resumed its attack on an enemy who had recovered from his surprise and whose resistance was frightfully stubborn. It required hard fighting to gain possession of the heights. The conquest of the Colle Abate was finally achieved during the night by the capture of Hill 915.

The 34th American Infantry Division had been unable to breach the German position. The American Commander then sent a regiment of the 36th American Infantry Division into the zone held by the 3d Algerian Infantry Division to attack in the direction of Mt. Castellone.

Maintenance of the Breach (27-30 January)

But the regiment required time to take up its position and it was not till the 30th that the American attack could be launched. In the meantime, from the 27th to the 30th, the 3d Algerian Infantry Division occupied a front of twelve kilometers and had its left wing buried like a wedge in the enemy's positions.

On the 27th, the enemy attacked from the west and north at the same time, after intensive artillery and mortar preparation. Nearly all of the artillery of the FEC was engaged in support of the 3d Algerian Infantry Division.

On the 28th and 29th the enemy renewed his efforts. On the 30th, the American attack was launched. The 34th American Infantry Division gained a foothold on the heights northeast of Cassino. The southern group of the 3d Algerian Infantry Division established itself on Colle Marino.

Consolidation of the Breach (31 January to 5 February)

On the 31st, the enemy, exhausted by his efforts of the preceding days, reacted very weakly. The 3d Algerian Infantry Division exploited this by definitely occupying Colle

Abate. The battle had not ended, however, and until 5 February, the enemy continued to counterattack several times a day. He failed, however, to retake any terrain.

The battle of Mt. Belvedere marked, therefore, the end of the first phase of the engagement of the French forces in Italy. This phase had been a brilliant one and we acquired great prestige in the eyes of the Allies.

The German Plan for the Invasion of Britain

An article in "The Tank" (Great Britain) November 1945.

DOCUMENTS discovered among the archives of the German General Staff in Berlin have revealed the enemy's plans for the invasion of Britain in the autumn of 1940. The first warning orders for this operation were issued in mid-August, about a month after the fall of France, and it was then stated that a further order for its actual execution would follow later, but this order was in fact never given, and the invasion never took place.

The forces allotted for the operations numbered twenty-three and one-half first line divisions with seventeen more in reserve; assuming these to be all at full strength, as they doubtless would have been, and adding the usual proportion of corps and army troops, this would represent a strength of about a third of a million men for the first line forces and a quarter of a million for the reserve—say 600,000 in all. Of the twenty-two first line divisions, fourteen were infantry, six armored and two motorized; in addition, there were one and one-half airborne divisions, which were to carry out a special operation of their own.

The first line force was to be divided into three armies. The Ninth Army on the right, starting from bases on the Belgian and French coast, at Ostend, Dunkirk and Calais, was to land in Kent and Sussex between Margate and Hastings. In conjunction with its operations, an airborne landing was to be made north of Romney Marshes. The Sixteenth Army in the center was to start from the stretch of French coast between Dieppe and Havre, with the British seaboard between Brighton and Portsmouth as its objective, and two airborne landings in conjunction with it were to be made on the South Downs. The Sixth Army on the left was to start from the Caen-Cherbourg area and to effect a landing in the vicinity of Bournemouth and Weymouth.

The plan of operations after the securing of the beachheads was to link up the forward troops of the three armies on a general front from the north bank on the Thames estuary about Tilbury across to Gravesend, thence along the ridge of the North Downs southwestwards to Caterham and westwards to Aldershot and thence southwards to the coast about Portsmouth. The Ninth Army was then to advance northwards into East Anglia as far as the Colchester area and the Sixteenth Army into the East Midlands, pinching out London between them, while the Sixth Army pushed up the estuary of the Severn. From that line mobile forces were to push further northwards into the Midlands towards Birmingham and the industrial areas of Lancashire and Yorkshire.

The German force allotted for the invasion of Britain was about the same strength as that used by the Allies later for the invasion of Normandy, though in the latter case the reserves were larger. On the other hand the forces which Britain had available for defense were pitifully weak. General McNaughton, in command of the VII Corps, had under him our only completely organized and armed formations—the 1st Canadian Division, part of the 2d Canadian Division, and certain British units; there were a few regular troops and Home Guards manning the beach coastal defenses, and that was all. The total strength of these forces was probably under rather than over 50,000 men, so that the defense would have been out-numbered by over

five to one by the German first line armies alone, and by more than ten to one when the German reserves were thrown in.

Our plan of defense was for the coastal garrisons to resist as long as possible, making use of such various secret and surprise devices as were available to inflict the maximum losses upon the enemy. When the inevitable penetration inland took place, the Canadian troops and any others available were to be thrown in for a counteroffensive in the area of the North Downs; but the final result of this battle could hardly be in doubt, in view of the crippling disparity between their numbers and those of the enemy.

As far as could be foreseen at the time, therefore, the German invasion of 1940, had it been launched, would have been as certain of ultimate success as any operation of war could well be. Heavy losses might have been suffered, but certainly not as heavy as those subsequently incurred in the invasion of Russia in the year 1941 alone.

Why the enemy never undertook it, despite the tremendous odds in its favor, of which he must have had a reasonably accurate idea, still remains a mystery. It is probable that his failure to do so was the most fateful of all the many blunders which lost him the war, for with Britain conquered and helpless, Russia could hardly have survived the subsequent attack on her, and America would have been deprived of her only possible forward base from which the reconquest of Europe could have been effected. It was the most perilous hour of all our history, and one which we must never allow to recur.

Self-Propelled Artillery in Breakthrough Operations

Translated and digested at the Command and General Staff School from a Russian article by Lieutenant Colonel G. Khainatsky in "Krasnaia Zvezda" (Red Star) 31 July 1945.

A modern defensive position is often a combination of field fortifications, chiefly of trench type, and a system of permanent positions disposed in depth. Destruction of concrete pillboxes becomes possible only after the enemy is cleared from the first line of trenches. The complexity of combat under these conditions arises from the fact that the advancing infantry is compelled to attack the trenches while still receiving fire from the concrete pillboxes, for ordinarily these cannot be completely neutralized during artillery preparations. Destruction of permanent defensive fortifications, which are the mainstay of a permanent defense, calls for strong, short-range direct firing, and while it is extremely difficult for field artillery to approach to within a short distance of a pillbox, self-propelled guns are able to maneuver freely in the vicinity of such emplacements. Since the advent of self-propelled artillery, the destruction of pillboxes has thus been more successful and the speed in the breakthrough of permanent defenses has increased considerably.

In neutralizing pillboxes, self-propelled guns also have the advantage of affording armored protection and being able to travel over all types of terrain. These guns, therefore, are not only employed successfuly against pillboxes but also against the infantry which is dug in between the pillboxes. This successful employment can not always be accomplished with field pieces, since their crews are vulnerable to flanking fire. With the use of the self-propelled artillery as an infantry-supporting gun there appears the possibility of what may be called a "through attack." In this, the infantry and the assault guns, operating continuously, penetrate the entire depth of the defensive zone of the enemy.

In October of 1944, for example, one of our units undertook a breakthrough operation against a German fortified position from a beachhead on the Narev River. When

the attack had progressed to the third line of trenches, the leading elements unexpectedly encountered a line of concrete pillboxes which was attacked unsuccessfully by storm groups, armed with heavy-caliber field artillery. Enemy pillboxes held off the guns, while their machine-gun fire inflicted serious casualties on the crews. Our artillery firing at long ranges was not able to cause much damage to the enemy fortifications. A heavy self-propelled artillery regiment was transferred from another sector to that front, and its guns were distributed among the assault battalions, one battery per battalion. The enemy was again attacked and all the advantages of self-propelled artillery became evident; the guns approached the pillboxes within 100 to 200 meters and pounded at the embrasures, forcing the enemy to cease fire. Our infantry was able to reach the pillboxes.

The self-propelled artillery, which accompanies the infantry in attacking enemy defenses in depth, in addition to engaging permanent fortifications, is able to cope successfully with the tasks of neutralizing both the antipersonnel fire and the antitank weapons. This can be done because an armored gun can reach within firing distance of enemy machine guns, and thus considerably shorten the time necessary to destroy an organized position.

In certain instances these assault guns are capable of destroying enemy machine guns with their tracks. This capability, however, should not be abused, because this is not the function of tanks and assault guns. In a breakthrough operation, using assault guns in such a way might be very advantageous. But self-propelled guns are dependable assault weapons and, like any artillery piece, they should be used chiefly in support of infantry battle formations and storm groups. If, however, the differences in the employment of artillery and tanks are not considered, and if an assault gun is made to open a path for the infantry with its tracks, then it no longer has the advantages of an assault weapon, and becomes just a poor tank. This is poor practice; for assault guns are not adapted to close combat with the enemy infantry, especially in the case of permanent defenses. Incidentally, it is precisely this unwillingness to consider the differences in the employment and in the construction of self-propelled artillery and tanks that occasionally leads to the improper use of the assault guns There were infantry officers who, during a breakthrough of the enemy defenses, tried to send their attached assault guns to attack ahead of the infantry. In such cases, the guns were more often than not put out of action by enemy infantry, leaving our infantry units without artillery support. Experience has shown that self-propelled guns operating with or behind infantry units are able to inflict greater casualties on the enemy than if they are employed in front of the infantry (like tanks). This applies particularly to 76-mm assault guns, which have been those most used for supporting the infantry.

Correct utilization of the self-propelled artillery when breaking through a permanent defense requires, above all, close cooperation with all arms. The closer the cooperation between the gun crews and the infantry units, the faster the enemy positions are eliminated and the advance facilitated.

Generally, during the breakthrough, the self-propelled guns supply the artillery support and aid the infantry assault groups. They support the infantry which has the mission of destroying the enemy and is wedged in among the pillboxes. The assault guns, while making preparations, should have at their disposal complete reconnaissance data on the nature and type of permanent fortifications and their disposition; the status and strength of the hostile forces; and the terrain and its accessibility to tanks. If possible, it is best to have the crews reconnoiter personally their respective sectors. This is necessary in order that the self-propelled guns may support the infantry successfully. An important factor is the coordination established between the infantry and artillery and among the self-propelled artillery groups.

It is quite essential that the missions of the assault guns be thoroughly planned. For example, in January 1945, before the breakthrough of the permanent German defense on the Vistula River, all our tanks and gun crews had gone up to the line of departure and learned precisely their respective places, direction of attack, and targets. This was done in spite of the narrowness of our beachheads, which made concealed approach to the forward area very difficult. The self-propelled guns moved out to the line of departure the night before the attack. This thorough preparation enabled the self-propelled artillery, in cooperation with the infantry, to achieve all its objectives. All guns moved forward ten or fifteen minutes before the infantry attack was launched and opened direct fire. At the same time, the self-propelled guns with the assault groups fired from distant positions in order to locate camouflaged emplacements and other fortifications.

Direct support self-propelled artillery guns kept up their fire from advanced positions even after the infantry had started its attack. When the infantry had approached to within thirty or forty meters of the first trench, the self-propelled guns ceased firing on receiving a signal from the infantry battalion commander. The infantrymen broke into the trenches and began mopping up the Germans. In the meantime, the direct support self-propelled batteries had advanced rapidly and caught up with the infantry. When the latter was wedged in between the pillboxes, the guns were already in battle position. The assault groups were committed, preceded by their self-propelled guns, after the first trench was cleared of the enemy.

During this period, the fire of the direct-support guns was directed against the hostile troops manning field fortifications. They did not attack any of the permanent emplacements, with the exception of those which were directly in front, or on the flanks, of the supported battalion and which impeded the movement of the infantry. The direct-support guns delivered direct fire against the embrasures of these emplacements, if they were not being attacked by the assault groups.

During the breakthrough of the German defenses in January 1945, self-propelled guns operated in support of the infantry on almost all fronts. Self-propelled artillery, employed in such a way, gave stability to infantry combat formations, and enabled them to neutralize enemy resistance more rapidly.

It is known that the enemy tries to counterattack with his tanks and infantry reserves the units that are wedged in among the pillboxes. In rejecting these counterattacks, the self-propelled artillery has displayed one of its most valuable qualities—great maneuverablity. The tanks, being ahead of the infantry, are not always able to arrive in time to beat off hostile flanking counterattacks. Such an operation is much better and more rapidly executed by the self-propelled artillery of infantry combat formations.

Experience has shown that it is desirable to have self-propelled artillery accompany the infantry, even when tanks participate in the breakthrough, Some of the guns protect the tanks; the rest of the guns support the infantry and its assault groups. It should be noted that guns of any caliber may be employed in the breakthrough of a permanent defense. Light artillery is used against enemy infantry and field works, medium and heavy artillery against permanent fortifications and also to accompany tanks.

Subordinate and absolute obedience is the soul of a military system.

—General José de San Martín, quoted in *Revista Militar*, Argentina

The Council of National Defense

Translated and digested at the Command and General Staff School from an article in Spanish by Colonel Benjamín Rattenbach in "Revista Militar" (Argentina) September 1945.

MODERN war demands the participation of all the forces of a country. Thus, not only the armed forces of the country participate, but also its political, economic and moral forces which, in contradistinction to its military forces, we might designate by the term of "civil forces."

At present, no one doubts the fact that the preparation of these forces, both military and civil, is indispensable in time of peace, to insure their success in time of war. But while the military forces possess a directing organism for this purpose—their respective ministries—the "civil forces," at least until recently, had no such body. This, therefore, is the first reason why the creation of the Council of Defense is justified: *to prepare the civil forces of the Nation for its defense.*

The second reason is of a definitely military nature. As is well known, the various branches of our armed forces had, up to now, made their preparations on the basis of an estimate of the situation as it affected them, which naturally resulted in an independent strategic solution of the problem at hand and also in the selection of independent objectives almost without considering the existence and activities of the other forces. Only in cases where they felt the need for mutual cooperation, in zones of possible interference or in combined operations requiring close contact, did their staffs get together to agree on the necessary details. Undoubtedly the success of meetings of this sort and the feasibility of the plans and agreements reached depended to a large extent on the good will of the participants, for when one of these did not agree with the propositions of the other, their future coordination and cooperation rested on a very doubtful basis.

There was needed, therefore, a directing body to unify divergent opinions on a given subject; for example, with regard to international political situation, a probable enemy, the initial solution of a problem, and the objectives to be attained by the different forces. This body would impose its decision in case the representatives of the armed forces could not reach an agreement.

This, then, is the second reason for the existence of the Council: *to insure unity of opinion in war preparations and assign to the different forces, on the basis of the plan as a whole, the objective that each of them is to attain.*

The third reason is human in its nature. By express provision of our Constitution, the supreme command of the military forces rests in the hands of the President. He is also the leader of the civil forces, as well as commander of both the civil and armed forces. Our Chief Executive has, thus, a triple function of command; on the one hand, he is commander in chief of armed forces; on the other hand, he is commander of the civil forces; and again, he exercises control over these forces as a whole or is, to use the term that has been applied recently to this office, "director of war."

These triple functions, especially the last ones, cannot be fulfilled by a single individual. He would have to be an extraordinary genius with a superhuman capacity for work to meet the requirements of a modern war.

It is necessary, therefore, that the director of war be assisted by an advisory body composed of specialists in every basic war activity in order that his task may be limited to solving major problems, as a last appeal. This is the third reason for the existence of the Council of National Defense, that is to say: *to advise the President in the conduct of the war.*

Many different solutions are possible for an institution of this type, but in selecting one, the object is not to copy some particular form, but to adopt the one that is best suited to the constitution and, above all, the military institutions of the country. In this

respect, our Council has adopted some ideas from the French and some from the United States, but above all it is Argentina's own solution. But our system must not be considered final and fixed. The evolution of a country's political and military institutions as well as those pertaining to its economy, its science and industries, produces a gradual modification in these organizations. In the Brazilian Council of Defense, for example, we have witnessed recently several changes. It would not be strange, therefore, if our own would have to undergo changes as time goes by.

Before entering upon the study of the Argentine Council of Defense, I must call attention to the fact that in order to understand it easily, it must be analyzed simultaneously with four other organizations which, although they are not an integral part of the council, do supplement it in a very efficacious manner and combine with it to form a harmonious system. I refer to the combination shown in Figure 1.

The separate organizations which combine to form this system are:

1. The Council of National Defense.
2. The Secretariat of the Council.
3. The Research Committees.
4. The Executive Commissions.
5. The Directorates of National Defense of the Ministries and Civil Departments.

1. The Council of National Defense is constituted by the President, the Ministers and members of the cabinet, plus a few military and civil advisers chosen in each case in accordance with the nature of the problems to be dealt with.

2. The Secretariat of the Council constitutes the driving force of the entire system shown in Figure 1, and it can be said without hesitation that the future of the Council depends, to large degree, on the efficiency of the Secretariat.

The *general mission* of the Secretariat *in time of peace is to coordinate and stimulate the work of the civil ministries and private organizations of the country in matters related to national defense* in harmony with the needs of the Armed Forces.

The internal organization of the Secretariat is shown in Figure 2.

3. The Research Committees.—The nature of the problems solved by the Council of National Defense requires the intervention of the most learned persons of the country in the particular subject under investigation. For this reason the decree that governs the Council provides for twenty research committees.

One interesting aspect of the research committees, worthy of note, is the presence of official and private technicians in their membership. As regards the official functionaries, it should be explained that they give their personal opinion as experts on the subject, without being obliged to follow the opinion of their superiors.

4. The Executive Commissions.—The administrative organization of our Executive Department is such that all its decisions are normally executed by a certain ministry. Nevertheless, in matters pertaining to national defense, there are certain problems involving several ministries whose execution cannot be entrusted to any one of them in particular, but must be referred, rather, to an inter-ministerial committee; for example, the problem of guarding our land and water frontiers where it is necessary to control the acquisition of properties, the installation of industries, the laying out of railroads and highways, etc. This requires the creation of special executive commissions which must be independent of the Secretariat, in order to retain their advisory character.

The Executive Commissions represent a solution adopted by the United States both in the first and the second world wars for the purpose of solving rapidly certain problems which affected various departments. This is exemplified by the various organizations, a list of which may be seen in the 1944 United States Government Manual.

5. The Directorates of National Defense.—Among the most useful of the complementary organizations of the Council of National Defense are the Directorates of Defense created in the civil ministries (see No. 5 in Figure

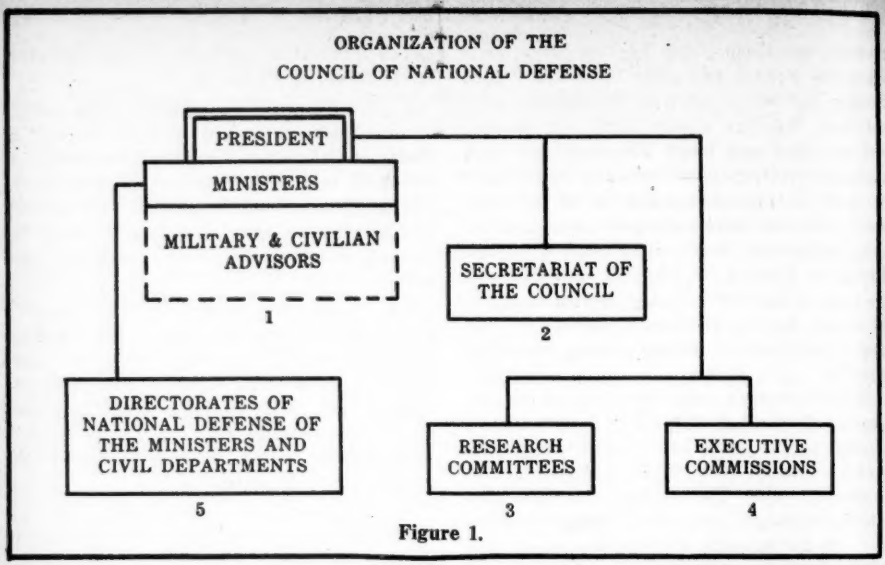


Figure 1.

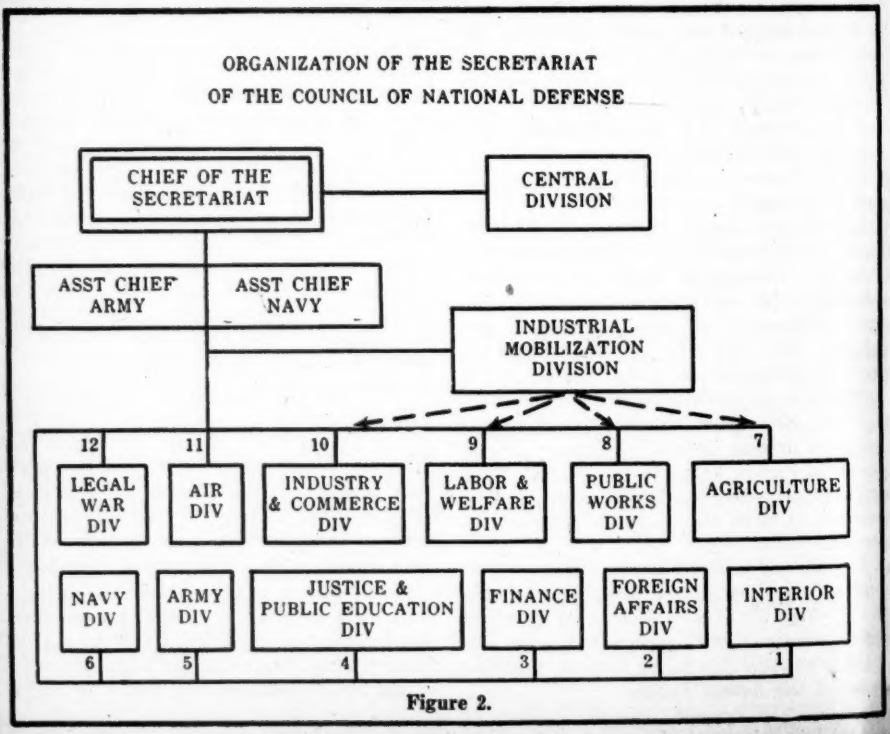


Figure 2.

1), which represent actual military cells ingrafted into the National Administration for purposes of defense.

The general mission of the Directorates of Defense is, first of all, the methodical preparation of the nation's resources in order to insure, in case of war, supplies for the armed forces and, secondly, to maintain as far as possible the normal life of the country during the period of hostilities.

The matters dealt with and the problems solved by the Council in its sessions proceed normally from three different sources:

1. From the *military ministries* which bring them up either because of the need of preparing for war or for reasons connected with the development of their forces in time of peace.

2. From the *civil ministries* when the latter find themselves obliged to solve problems connected with national defense.

3. From the work of the *Secretariat* as a result of its coordinating mission in connection with defensive preparations.

In time of war, provision is made for the functioning of the whole Council in cases where matters of interest to all the ministries are being considered. On the other hand, as regards the conduct of the war, provision was made for the formation of a smaller council formed by six ministers; the President, the three Military Ministries, the Minister of Foreign Affairs, and a Minister to coordinate the national economy. In this way, the conduct of war would be in the hands of a smaller group, after the manner of the English War Cabinet, which is much smaller than the normal Cabinet.

Military Hierarchy

Translated and digested at the Command and General Staff School from an article in Spanish in "Memorial del Ejército de Chile" January-February 1945.

THERE is no other institution in which the relations between the component parts are more accurately defined than the armed forces. And this is obvious, since discipline is what upholds them. It is well understood that discipline implies not only duties, but right, as well. For all efficient and pleasant existence is nothing more than the harmonious interplay of an honorable fulfilment of duty and noble enjoyment of rights.

Thus, discipline becomes the highest exponent of a good education, the most outstanding manifestation of culture. The more disciplined is a civilization, a people, or a family, the greater their education. In the army, discipline is measured by the education of its members. The codification of restrictive rules, the most carefully drawn up of regulations do not suffice nor fulfill their real purpose unless backed up by understanding, stimulus and emulation.

Understanding of one's rights and duties, as they are limited by the rights and attributions of others; stimulus, which comprises the knowledge that one is protected in the proper exercise of his obligations; emulation, which comes from the conviction that one is an efficient collaborator with an enthusiastic initiative which finds understanding in our subordinate officers and stimulus in our seniors, are absolutely essential.

No one, therefore, on the basis of privilege, enjoys unbounded authority except by constant effort. Moreover, it is human to err, and he who, before judging others, first judges himself, is indeed wise.

If, basically, a misuse of authority involves serious evil, in the case of the armed forces its effects are particularly harmful, for each echelon of their organization requires subordination and command forming a closely linked chain. Not even in the lowest echelon of the organization does a soldier cease to act as a leader; that is, rather than exercising command, the aim should be: "faithful example of fulfilment of obligations." For,

knowing how to fulfill his duty faithfully is one of the fundamental attributes of a real leader, and command is nothing but an aspect of this function.

One is not a leader by merely having rank for the purpose of exercising, making felt, or enjoying command. A leader is one who, while performing his individual obligations, fulfills with initiative that part of the task for which he is responsible. A good leader is one who, devoid of self-importance, knows and thoroughly understands that he is nothing more than a cell—never an organ by himself however high his rank may be—of a large organization that functions better when the performance of each of its integral parts is harmonious and uniform. A great leader is one who, embodying the double personality of subaltern and superior, shows the firmness of his personality and the excellence of his virtues by setting a good example.

The mission of a leader is noble, responsible, and of great importance. Especially is this true when the leader, a soldier by nature, attains a prominent position. Don Domingo Amunátegui Solar writes: "Don Bernardo O'Higgins was as poor a statesman as he was glorious a soldier. During his period in office, from 1817 to 1832, O'Higgins was a dictator, just as Bolívar was in Greater Colombia and San Martín in Peru." "He desired," affirms Cervinus, great European historian, "that everything should go according to his personal ideas, and when he thought it expedient, he unscrupulously placed himself above the law."

In the equilibrium of human coexistence, when reciprocity between the component parts is lacking, the resultant disintegrating action is fatal. And it becomes most palpable in the conditioned relations between superior and subaltern, for the individual that expects more of others than of himself, as a result of that false and handy standard which impels him to demand and expect correctness and justice to a greater extent than he is impelled to practice them, becomes a severe and unjust judge.

Discrimination shows how delicate a matter leadership is, since the leader is the subject of constant observation, which is not always high-minded and respectful; for to be a good leader requires special ability and comprehension of the psychology of the whole as well as of the component parts.

The leader will certainly not attain the high position of authority—of a master we might say—if he lacks intellectual and moral integrity. For if in each echelon one is at the same time pupil and master, the true master is one who is willing to sacrifice himself and act in behalf of others and the cause he is serving. Hence, it follows that a soldier's profession is, in truth, a calling in which only those attain eminence who add to their knowledge a sense of what is just.

The leader must possess unquestioned intellectual and moral authority, qualities he will attain when his commands and acts are imbued with wisdom, correctness, moderation and equanimity. For, it is not permissible in the exercise of his command, to show preferences or antipathies or to fall into errors, however slight these may be, because subalterns will immediately realize his shortcomings. Leadership requires the sacrifice of one's own conveniences and natural inclinations when they do not harmonize with the correct fulfilment of duty.

An exacting mission is that of the soldier. And, by the same token, it is not always easy to perform.

One is doomed to failure when, through unwarranted confidence in oneself, one believes that personality and prestige are increased by imposing his own ideas and will on others without regard for their personalities and good qualities. One errs when one confuses the exercise of command with abuse of power —rank grants nothing but authority—and forgets that a leader is really superior if he shows wisdom and is able to act in accordance with the wisdom and merits of others. Authority is not imcompatible with reasonableness and good intentions; on the contrary, this increases the esteem in which one is held.

Development of Specialized Armor During the War

An article by Major General Sir Percy C. S. Hobart in "Aim," army magazine of the British Middle East Command, No. 55, November 1945.

WITHOUT specialized tanks the invasion of "Fortress Europe"—launched as it was against strong defenses and ready defenders—would have been a far more costly operation. Ours was the only army that used these equipments, and they achieved surprise and considerable success.

The lessons learned in the Dieppe raid of 1941, coupled with other reasons, prompted the CIGS, (Chief of the Imperial General Staff) Lord Alanbrooke, to centralize the development of special armor devices. The 79th Armored Division, already existing in standard form, was converted for the purpose; and during the succeeding years gradually assumed command of all units equipped with "funnies." At its peak period the division comprised 21,500 all ranks and over 1,900 tracked vehicles.

The initial problem was the invasion of the Continent, and as fresh intelligence came to light 79th Armored Division had the task of working out solutions

The foundation of each "drill" was a mixed assault team of special tanks, supported by normal tanks and other arms as necessary. These teams, composed almost entirely of armor, were able, with comparatively few casualties, to breach the hard crust of enemy defenses—minefield, wire, concrete, etc., and allow tanks and infantry through to the objectives.

Crabs (Sherman flails) normally led the way, beating tracks through the minefield. AVRE's (armored vehicles, Royal Engineers) followed, each with a crew of six sappers prepared for manual charge-placing in the lee of their AVRE, for concrete busting with the Petard, or for bridging.

These AVRE's could carry four-ton fascine bundles of SBG (small box-girder) bridges on their noses for crossing ditches or for scaling concrete walls; the crews were also trained to operate Snakes (bangalore tubing) against mines inaccessible to Crabs.

Crocodiles (Churchill flame-throwers) often operated in support of the following infantry. This much-feared weapon proved a great success against pillboxes and defended houses or when used to burn up Germans in slit-trenches and among trees.

The Kangaroo (gutted Ram) armored personnel carrier was in great demand to carry assaulting infantry, accompanying tanks to within close range of their objective.

The age-old method of amphibious operations was revolutionized by the DD tank and the Buffalo (LVT). The former was particularly valuable on D-day and in the Rhine and Elbe crossings. Buffaloes could carry a platoon of men, a carrier or antitank gun through water or inundations. This made them invaluable throughout the winter operations in the Low Countries.

Field Marshal Montgomery reversed the fundamental principle of combined operations when he landed armor in the van of his invasion armies. The success of this experiment justified its repetition and development, and the new assault technique has now become an accepted tactic.

Equally justified has been the principle of centralized control. All specialized tank units operated in support of other formations, but under the control of a 79th Armored Division commander, who also advised on their employment. It has now been recommended that in any future Expeditionary Force one such formation should be included directly under command.

Field Marshal Montgomery has written: "The record of this division is unique and its contribution to the winning of the campaign in Northwest Europe has been incalculable."

The development of specialized armor must continue, and the field of research is wide. It is essential to the survival of the British Commonwealth of Nations that we shall not for the third time enter unprepared the lists of world-wide war.

The Acid Test of Leadership

An article in "An Cosantóir" (Eire) November 1945.

EVERY campaign is replete with good and bad instances of leadership, of the swashbuckler back in the garrison who fails when the pressure is on; of the modest, retiring, individual who comes through in the pinch; of the supply officer who gets the "pallets and tucker" to the troops in spite of hell and high-water; of the communications officer who lays and maintains fabulous amounts of wire; of the mess sergeant who improvises ranges, bake ovens, and utensils out of gasoline drums and discarded tins; of the infantry captain who adjusts his own artillery fire while leading an assault; of the platoon leader who, when his platoon is cut off and surrounded by enemy at night, says confidently, "Well, boys, this is where we show those so-and-so's what we can do."

Unfortunately, at least for those affected, the instances of poor leadership are not so well known, sometimes because no one returns to tell of them, or they are not readily recognized. Some of the latter cases are those where a leader has failed to foresee and plan his actions which should follow a success but is content to rest on his laurels; where he fails to provide reserves of rations and ammunition for emergency use; where he permits a setback to discourage him and allows his feelings to be transmitted to his men; where he fails to issue clear and definite instructions and then blames someone else; where, through a mistaken notion of not overworking his men he fails to insist on adequate security and protection for them; or to have an alternative plan to accomplish his mission if the original plan goes wrong, which the best of plans usually do.

The young leader of today has an enormous burden to carry. He comes into the service fresh from school or civilian pursuits; he is required to learn weapons, tactics, and administration at the same time he commands a group of men who usually have no more training than he; he must live with them, look out for them, and lead them in battle. Truly his is a heavy load and the wonder is that so many do such a fine job.

But let us help him all we can to prepare himself. Let us place as much responsibility upon him during training as he can bear; let us give him more and more opportunities to lead, to exercise initiative, to think, to plan ahead, to actually command his unit and develop his own self-confidence and build up the confidence of his men in him. Let us plan our training programs, schedules, exercises, and schools with this in mind; for after all it is the small unit, the squad and platoon, which will win this war, not the higher commanders and their staffs, however brilliant and efficient they may be.

German Casualties

Secret German casualty figures discovered in the house of the chief of the German High Command's propaganda department are extremely interesting. From the beginning of the war until November 1944, German Army casualties on all fronts came to 1,911,300 killed and 1,435,853 missing. These large figures may be compared with the total number of Germans killed in the last war of two million and our Imperial dead in this war of just over half a million. But at the same time they are far below what we should have expected, particularly on the Eastern Front, where the German figures until November 1944 are 1,419,000 killed and 907,000 missing. Yet on 22 June 1943 an official Russian statement was issued estimating German killed at 6,400,000. Far more striking was the admission in that same document that the Russians themselves had already suffered 4,200,000 killed and missing—more by then than the German figures for the whole course of the war.—*Manchester Guardian Weekly* (Great Britain).